MURDER, MAYHEM AND MADNESS...

SOLVE THEM.
IF YOU CAN!

Try these to start:

Which musician in the group started an argument— and murdered a choir member?

Who cheated at cards?
And how did this lead to a killing?

How could a little backstage whistling (which many actors consider bad luck) cause still another death?

There are dozens more lawbreakers to apprehend, plus seven other puzzles where you have to find a missing word or number. Take a peek at hints or clues, if you must, and study the pointers for help in devising a strategy. If you use your brain, you'll soon be right on the trail of the evildoers.

So catch them if you can!

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George J. Summers

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Mind Bafflers

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Preface

The thirty-six puzzles in this book have been composed to resemble short whodunits. The "culprits" in them consist of twenty-nine people, four words, one number, one nationality, and one box.

The puzzles include six "novels" with each novel consisting of a prologue followed by four parts. The four parts are four different puzzles. Three characteristics of the novels are as follows:

(1) The information in the prologue of a novel must be used to solve each part of the novel.

(2) The solution to each part of a novel is independent of the solutions to the other three parts.

(3) The kinds of statements in one part of a novel are not the same as the kinds of statements in another part.

The kinds of statements in a novel occur in the following way. In *The Card Players, Company of Actors, The Gourmet Diners,* and *The Vacationers:* Parts Two and Four contain false statements, while Parts One and Three do not; Parts Three and Four contain hypothetical statements (identified below), while Parts One and Two do not. In *The Choir* and *The Mystery Writers*: Parts Two and Four contain hypothetical statements, while Parts One and Three do not; Parts Three and Four contain self-referenced statements with the "I" in them, while Parts One and Two do not.

The puzzles that are not novels are referred to as "short stories" or "novelettes," depending on their comparative lengths.

Should you need help in deciding what you have to do in order to solve a particular puzzle, you can refer to a solution scheme (there are thirty-four) or to a hint (there are two) that accompanies it.

Twelve puzzles involve reasoning with hypothetical statements and six of those puzzles involve deciding which hpothetical statements are true and which are false. An explanation of what hypothetical statements are and how their truth-values can be determined is given on the next page.

Hypothetical Statements

A hypothetical statement is a statement that has a hypothesis and a conclusion, as in: If Vanessa was a human, then Vanessa was a living thing.

The hypothesis follows "if." In this case, it is "Vanessa was a human." The conclusion follows "then." In this case, it is "Vanessa was a living thing."

Is the statement about Vanessa false when the hypothesis is false? That is, is the statement about Vanessa false when Vanessa *was not* a human?

Suppose that Vanessa was not a human. Then: (i) Vanessa may have been an animal, such as a rabbit. In which case, Vanessa was a living thing. (ii) Vanessa may have been an object, such as a boat. In which case, Vanessa was a nonliving thing.

Because Vanessa may have been either a living thing or a non-living thing, when Vanessa was not a human, there are no restrictions on the conclusion of the statement. So a false hypothesis does not make a statement false. That is, from Case i,

A. When the hypothesis is false and the conclusion is true, a hypothetical statement is true;

and, from Case ii,

B. When the hypothesis is false and the conclusion is false, a hypothetical statement is true.

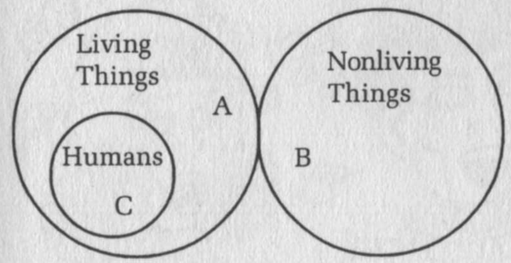
Is the statement about Vanessa true when the hypothesis is true? That is, is the statement about Vanessa true when Vanessa *was* a human?

Because Vanessa *must* have been a living thing when Vanessa was a human,

C. When the hypothesis is true and the conclusion is true, a hypothetical statement is true.

D. When the hypothesis is true and the conclusion is false, a hypothetical statement is false.

In the diagram, each circle has a label that tells what is inside it; "humans" are inside two circles. True Situations A, B, and C are illustrated in the diagram. Nowhere can false Situation D be illustrated, because it is *not possible.*



From the previous analysis, the following principle emerges: When a hypothetical statement is true, you cannot tell whether the hypothesis is true or whether the conclusion is true; when a hypothetical statement is false, you know immediately that the hypothesis is true and the conclusion is false.

The Choir

Prologue

The members of a choir assembled on an estate one weekend to perform in two concerts.

[I] Some of the choir members were to sing only in Beethoven's *Choral Symphony* and the rest of the choir members were to sing only in Mahler's *Symphony of a Thousand*.

[II] A curious thing happened that weekend: Any statement made by a member who was to sing in Beethoven's symphony was true, and any statement made by a member who was to sing in Mahler's symphony was false.

Part One: The Accuser

Before the concerts, one of a group of four sopranos made an accusation against someone.

[1] After the accusation, the four sopranos made the following statements.

Astrid: The accuser was Bertha.

Bertha: The accuser's room is next to at least one room whose occupant is to sing in Mahler's symphony.

Cheryl: The accuser was Astrid.

Doreen: The accuser is to sing in Mahler's symphony.

[2] The four sopranos had these connected rooms on the estate:

bath	*Astrid*	*Bertha*	*Cheryl*	*Doreen*	bath

Who was the accuser?

Solution Scheme on page 14;
Solution on page 70.

Part Two: The Accused

Before the concerts, one of a group four basses was accused of being a traitor to his country.

[1] After the accusation, the four basses made the following statements.

Edgar: If the accused was Frank or Homer, then the accused was Frank.

Frank: The room of the accused is not next to a room whose occupant is to sing in Beethoven's symphony.

Giles: At least two of us four are to sing in Mahler's symphony.

Homer: If the accused was Edgar or Giles, then the accused was Giles.

[2] The four basses had these connected rooms on the estate:

bath	*Edgar*	*Frank*	*Giles*	*Homer*	bath

Who was the accused?

Solution Scheme on page 14;
Solution on pages 70-71.

Part Three: The Eavesdropper

Before the concerts, one of a group of four altos eavesdropped on an accusation.

[1] After the accusation, the four altos made the following statements.

Irene: At least two of us four are not to sing in the symphony that I am to sing in.

Joyce: At least two of us four are to sing in the symphony that I am to sing in.

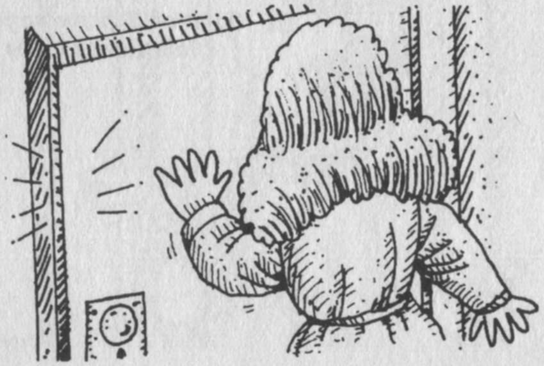
Karen: The eavesdropper is to sing in the symphony that I am to sing in.

Lydia: The eavesdropper's room is next to at least one room whose occupant is to sing in the symphony that I am to sing in.

[2] The four altos had these connected rooms on the estate:

bath	*Irene*	*Joyce*	*Karen*	*Lydia*	bath

Who was the eavesdropper?



Solution Scheme on page 15;
Solution on page 71.

Part Four: Death of a Choir Member

When an eavesdropper to an accusation of treason revealed the identity of the accused person to one of a group of four tenors, that tenor murdered the accused person; the concerts were then canceled.

[1] After the murder, the four tenors made the following statements.

Mark: If the symphony that the murderer was to sing in was not the symphony that I was to sing in, then the murderer's room is next to at least one room whose occupant was to sing in the symphony that I was to sing in.

Neal: No two of us four who were to sing in the symphony that I was to sing in, have adjacent rooms.

Owen: The murderer was neither Neal or Paul.

Paul: If the murderer was to sing in the symphony that I was to sing in, then I am not the murderer.

[2] The four tenors had these connected rooms on the estate:

bath	*Mark*	*Neal*	*Owen*	*Paul*	bath

Who was the murderer?

Solution Scheme on page 15;
Solution on pages 72-73.

The Choir

Solution Schemes

Part One: The Accuser

Make a chart for yourself as follows:

	True	False
Astrid's Statement		
Bertha's Statement		
Cheryl's Statement		
Doreen's Statement		

Put X's in the appropriate boxes of the chart so that [I], [II], and [2] are not contradicted.

Part Two: The Accused

Make a chart for yourself as follows:

	True	False
Edgar's Statement		
Frank's Statement		
Giles's Statement		
Homer's Statement		

Put X's in the appropriate boxes of the chart so that [I], [II], and [2] are not contradicted.

Part Three: The Eavesdropper

Make a chart for yourself as follows:

	True	False
Irene's Statement		
Joyce's Statement		
Karen's Statement		
Lydia's Statement		

Put X's in the appropriate boxes of the chart so that [I], [II], and [2] are not contradicted.

Part Four: Death of a Choir Member

Make a chart for yourself as follows:

	True	False
Mark's Statement		
Neal's Statement		
Owen's Statement		
Paul's Statement		

Put X's in the appropriate boxes of the chart so that [I], [II], and [2] are not contradicted.

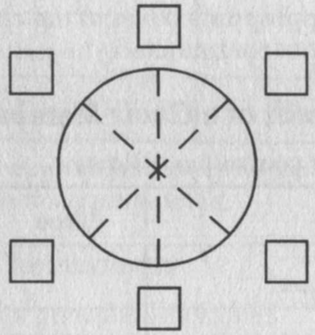
The Card Players

Prologue

Five adults met regularly to play cards.

[I] The five card players were a widower, his son, his son's wife, his daughter, and his daughter's husband.

[II] Each time they played cards, the chairs in which they sat were arranged this way around a table:



Part One: The Scorekeeper

The first time they played cards:

[1] The scorekeeper was the only person who sat between a man and a woman.

[2] Neither woman sat next to her husband.

[3] The oldest man sat next to the empty chair.

Who was the scorekeeper?

Solution Scheme on page 21;
Solution on pages 73-74.

Part Two: The Cheater

The third time they played cards, the women tried to get the men to recall the seating arrangement the second time they played cards. The following statements were made in the order given.

[1] Widower: I sat directly across from my daughter.

[2] Widower's son: I sat directly across from my sister's husband.

[3] Widower's daughter's husbad: I sat next to the empty chair.

[4] Widower's daughter: Exactly one of you men lied and cheated the second time we played cards.

[5] Widower's son's wife: The man who cheated did not sit next to a woman.

It turned out:

[6] Each woman told the truth.

Who was the cheater?

Solution Scheme on page 21;
Solution on pages 74-76.

Part Three: The Empty Chair

The fourth time they played cards, after sitting directly across from the empty chair became a good-luck omen:

[1] If the widower's son sat directly across from a man, then he sat next to his father.

[2] If the widower's daughter's husband sat directly across from a man, then he sat next to the widower's son.

[3] If the widower sat directly across from a woman, then he sat directly across from his daughter.

[4] If the widower's son's wife sat directly across from a man, then she sat directly across from the widower.

[5] Each man sat next to a woman.

Who sat directly across from the empty chair?

Solution Scheme on page 21;
Solution on pages 76-77.

Part Four: Death of a Card Player

The fifth time they played cards:

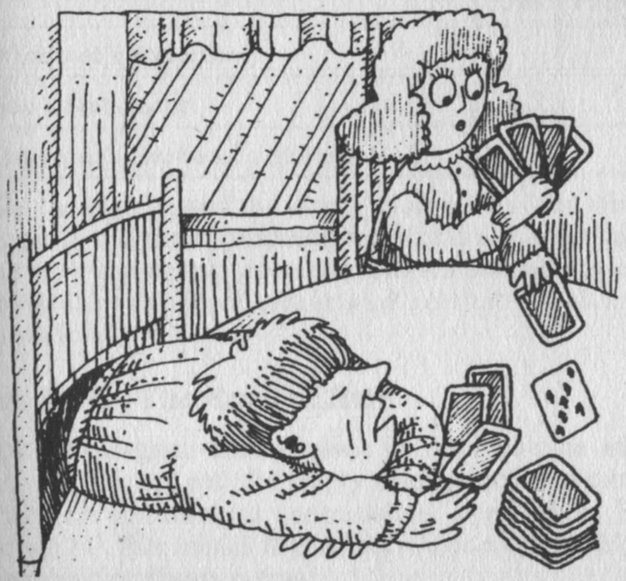
[1] The widower was murdered by one of the other four card players.

[2] Each man sat next to a woman.

The next day, because it was thought that the widower was murdered by a person who earlier had sat next to him, the other four card players made the following statements.

[3] Widower's daughter: If only one person sat next to my father, then that person was not me.

[4] Widower's daughter's husband: If only one person sat next to my wife's father, then that person was not me.



[5] Widower's son: If anyone sat directly across from my father, then that person was me.

[6] Widower's son's wife: If anyone sat directly across from my husband's father, then that person was me.

It turned out:

[7] Only the murderer lied.

Who was the murderer?

Solution Scheme on page 22;
Solution on pages 77-78.

The Card Players

Solution Schemes

Part One: The Scorekeeper

Copy the diagram that appears in the Prologue. Using symbols (such as M_1 for the widower, M_2 for the widower's son, W_2 for the widower's daughter, W_0 for the son's wife, M_0 for the daughter's husband, and E for empty), place the players and the empty chair around the table so that no condition is contradicted.

Part Two: The Cheater

Copy the diagram that appears in the Prologue and make a chart for yourself as follows:

	True	False
Widower's Statement		
Son's Statement		
Daughter's Husband's Statement		

Place the players and the empty chair around the table and put X's in the appropriate boxes of the chart so that the men's statements and the women's statements are consistent with each other and so that [6] is not contradicted.

Part Three: The Empty Chair

Copy the diagram that appears in the Prologue and place the players and the empty chair around the table so that no condition is contradicted. For each of [1] through [4], this means that no conclusion can be false when the hypothesis is true.

Part Four: Death of a Card Player

Copy the diagram that appears in the Prologue and make a chart for yourself as follows:

	True	False
Son's Statement		
Daughter's Statement		
Daughter's Husband's Statement		
Son's Wife's Statement		

Place the players and the empty chair around the table and put X's in the appropriate boxes of the chart so that [1], [2], and [7] are not contradicted and so that the suspects' statements are consistent with each other. This means, in part, that only one of the suspects' statements can have a false conclusion when the hypothesis is true.

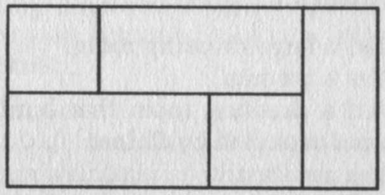
Company of Actors

Prologue

Five people formed a company of actors.

[I] The actors were three women — Anita, Chloe, and Edith — and two men — Brian and David.

[II] Each of the five actors had a different one of these dressing rooms:



Part One: The Playwright

For their first play:

[1] The dressing room of the playwright, who was one of the five actors, was the only room that bordered on exactly two other woman-occupied rooms.

[2] Anita's dressing room and Brian's dressing room bordered on the same number of other rooms.

[3] Chloe and David had the same size dressing room.

[4] Edith's dressing room bordered on one more man-occupied room than Anita's did.

Who was the playwright?

Solution Scheme on page 27;
Solution on pages 78-80.

Part Two: The Whistler

Just before the performance of their second play:

[1] Reading clockwise from the right end, the dressing rooms were occupied by Edith, Anita, Brian, Chloe, and David.

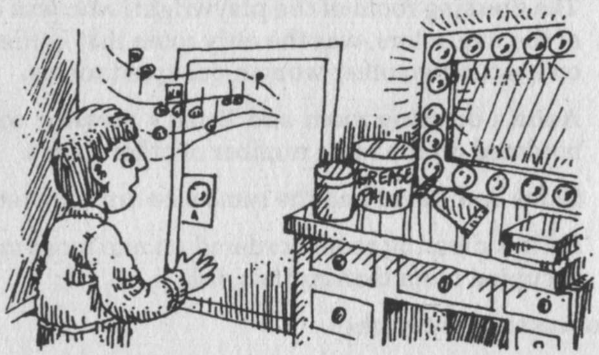
[2] One of the five was heard to be whistling — an act purported to be unlucky.

[3] An investigation turned up evidence that seemed to indicate the whistler had the following characteristics.

   i. Had a large dressing room.
   ii. Was a woman.
   iii. Had a dressing room that bordered on the room occupied by Chloe.
   iv. Was not David.
   v. Had a dressing room that bordered on the room occupied by Edith.

[4] It turned out *not* to be true that exactly three of these characteristics were correct.

Who was the whistler?



Solution Scheme on page 27;
Solution on page 80.

Part Three: The Director

During a rehearsal for their third play:

[1] Reading clockwise from the right end, the dressing rooms were occupied by Anita, Brian, Chloe, Edith, and David.

[2] The director, who was one of the five actors, revealed that one of the other four was the director's sibling.

[3] If the director and the director's sibling had dressing rooms that bordered on each other, then the director's sibling was a woman.

[4] If the director and the director's sibling had dressing rooms that bordered on a different number of other rooms, then the director and the director's sibling were the same sex.

[5] If the director and the director's sibling had dressing rooms that were a different size, then the director had a large dresssing room.

[6] If the dressing room of the director bordered on a larger number of other rooms than the dressing room of the director's sibling did, then the director and the director's sibling were the opposite sex.

Who was the director?

Solution Scheme on page 27;
Solution on pages 81-82.

Part Four: Death of an Actor

During the performance of their fourth play:

[1] Edith was murdered in her dressing room, which was the small one that bordered on three other rooms.

Many years later, the remaining four actors tried to recall the circumstances surrounding the unsolved murder.

[2] They made the following statements.

Anita: If Edith's dressing room and the murderer's dressing room bordered on the same number of other woman-occupied rooms, then David and I had dressing rooms that were not the same size.

Brian: If Edith's dressing room and the murderer's dressing room did not border on each other, then David and I had dressing rooms that were not the same size.

Chloe: If Edith's dressing room and the murderer's dressing room bordered on each other, then Brian and I had dressing rooms that bordered on each other.

David: If Edith's dressing room and the murderer's dressing room bordered on the same number of other man-occupied rooms, then Brian and I had dressing rooms that were the same size.

It turned out:

[3] Only one person told the truth.

Who was the murderer?

Solution Scheme on page 28;
Solution on pages 82-84.

Company Of Actors

Solution Schemes

Part One: The Playwright

Copy the diagram that appears in the Prologue and place the actors in the dressing rooms so that no condition is contradicted.

Part Two: The Whistler

Make a chart for yourself as follows:

	True	False
Characteristic i		
Characteristic ii		
Characteristic iii		
Characteristic iv		
Characteristic v		

Put X's in the appropriate boxes of the chart so that [1], [2], and [4] are not contradicted.

Part Three: The Director

Choose a hypothesis, from among [3] through [6], whose truth and then falsehood will produce a minimum of director-sibling pairs that satisfy [1] and [2]. Then use the other three hypotheses from [3] through [6] to eliminate as many of those director-sibling pairs as possible.

Part Four: Death of an Actor

Copy the diagram that appears in the Prologue and make a chart for yourself as follows:

	True	False
Anita's Statement		
Brian's Statement		
Chloe's Statement		
David's Statement		

Place the actors in the dressing rooms and put X's in the appropriate boxes of the chart so that [1] and [3] are not contradicted and so that the suspects' statements are consistent with each other. This means, in part, that only three of the suspects' statements can have false conclusions when the hypotheses are true.

Ten "Short Stories"

Sixteen Grades

Four students — Ramona, Sophia, Tamara, and Ursula — took four tests.

[1] The records of their grades were as follows:

	Test 1	Test 2	Test 3	Test 4
Record 1	C	C	C	C
Record 2	C	C	B	D
Record 3	B	B	D	D
Record 4	B	B	C	A

[2] Either Ramona or Sophia did not have any C's.

[3] Either Sophia or Tamara did not have any B's.

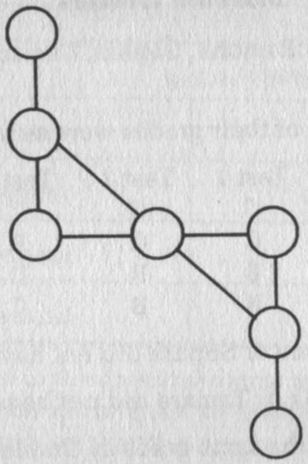
[4] Tamara had the same grade as Ursula on two tests.

[5] Ursula did not have the same grade as Ramona on any test.

Who had the only A?

Solution Scheme on page 40;
Solution on page 84.

Seven Numbers



Place a number in each circle in the figure above so that:

[1] Each number is either 2, 3, 4, 5, 6, 7, 8, 9, or 10.

[2] No two numbers are the same.

[3] The product of the three numbers in each row is equal to the product of the three numbers in any other row.

What number is placed in the center circle (the cirlce with the four "spokes")?

Solution Scheme on page 40;
Solution on pages 84-86.

Bank Robber's Nationality

In attempting to identify a male bank robber, six witnesses each gave a different one of the following descriptions of the robber.

Nation-ality	Age in years	Height in inches	Weight in pounds	Unusual feature	Colour of his car
[1] British	20 to 30	76 to 80	190 to 210	squint	white
[2] French	30 to 40	72 to 76	190 to 210	lisp	red
[3] German	40 to 50	68 to 72	170 to 190	scar	brown
[4] Italian	40 to 50	64 to 68	150 to 170	limp	brown
[5] Spanish	40 to 50	68 to 72	190 to 210	squint	red
[6] Spanish	50 to 60	68 to 72	130 to 150	lisp	black

It turned out:

[7] All the witnesses got the same number of particulars correct from the six listed.

[8] Exactly one of each kind of particular was correct.

What was the nationality of the bank robber?

Solution Scheme on page 40;
Solution on pages 87-88.

The Test

Six students — Graham, Harlow, Irving, Jordan, Kermit, and Lester — answered six questions on a test consisting of two multiple choice (a, b, c, or d) questions and four true or false (t or f) questions.

[1] They answered the questions as follows:

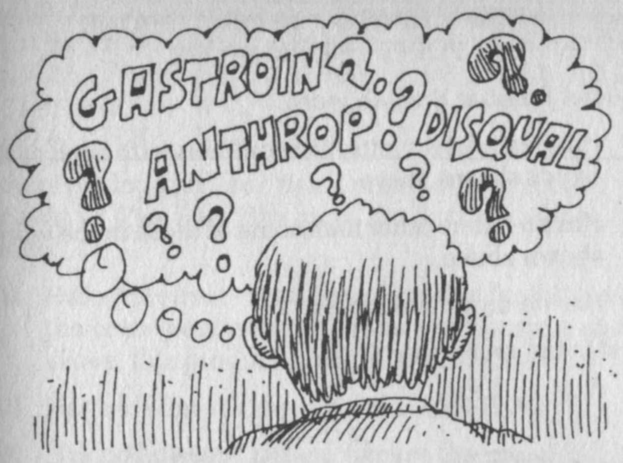
	I	II	III	IV	V	VI
Graham	a	a	t	t	t	t
Harlow	b	b	f	f	f	t
Irving	c	c	f	t	f	f
Jordan	d	a	f	f	t	t
Kermit	b	c	t	f	t	f
Lester	d	d	f	t	f	t

[2] No two students got the same number of correct answers.

Who got the most correct answers?

Solution Scheme on page 40;
Solution on pages 88-90.

Big Word


GASTROIN?
ANTHROP?
DISQUAL

A certain big word has twelve letters.

[1] Each pair of letters shown below consists of one letter contained in the big word and one "other" letter; J and V are not included.

A	B	D	E	F	H	N	O	P	Q	S	U
C	G	K	L	M	I	X	W	T	R	Z	Y

[2] When the letters in the big word are put in the proper order and each "other" letter is put beneath each letter in the big word, the "other" letters will appear in alphabetical order.

[3] The big word has the same number of letters in common with each of the following words:

LACE TWIG QUIZ FRANK CHAPEL POLICY

What is the big word?

Solution Scheme on page 40;
Solution on pages 90-91.

Secret Word

ARISE HASTE NOISE PHONE
POINT STAIR STORE

A secret familiar English word:

[1] Has exactly two letters in common with each of the words shown above.

[2] Has no letters other than some of those in the words shown above.

[3] Has no duplicate letters.

What is the secret word?

Solution Scheme on page 41;
Solution on pages 91-92.

Letter Multiplication

A 1	E 5	I 9	M 13	Q 17	U 21	Y 25
B 2	F 6	J 10	N 14	R 18	V 22	Z 26
C 3	G 7	K 11	O 15	S 19	W 23	
D 4	H 8	L 12	P 16	T 20	X 24	

After Penelope (called "Pen") married Ben Pen, she was known as Pen Pen. She now has a child whose first name:

[1] Has a "product" that is equal to that for PEN; using the correspondence of letters and numbers shown above, this product is equal to 16 x 5 x 14.

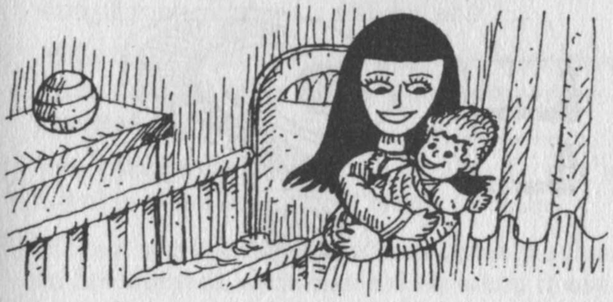
[2] Has no letter in common with BEN PEN.

[3] Has no adjacent letters that are the same.

[4] Has its letters in alphabetical order when the second letter replaces the fourth letter, which in turn replaces the sixth letter, which in turn replaces the second letter.

[5] Has exactly six letters.

What is the first name of Pen Pen's child?



Solution Scheme on page 41;
Solution on page 93.

Word Addition

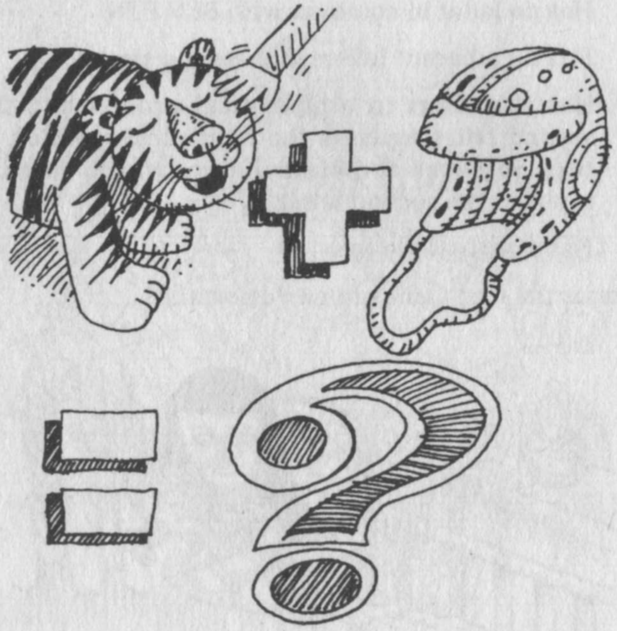
$$\begin{array}{rcccccc} & T & A & M & I & N & G \\ + & H & E & L & M & E & T \\ \hline & 9 & 2 & 5 & 7 & 6 & 4 \end{array}$$

In the addition shown above, the sum represents a word.

[1] Each letter represents a different digit.

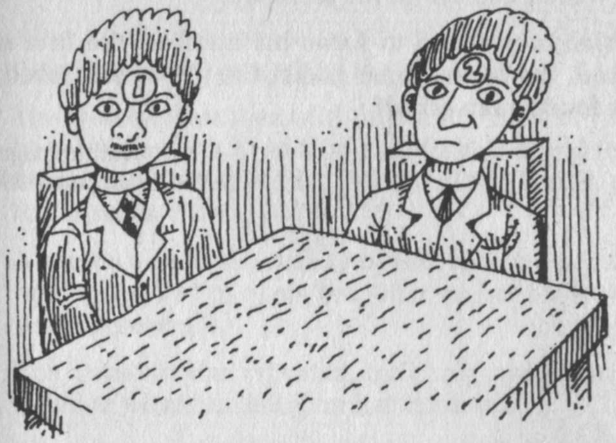
[2] No letter represents zero.

What word is represented by 9 2 5 7 6 4 ?



Solution Scheme on page 41;
Solution on pages 94-95.

The Four Numbered Disks



Four men were seated around a table.

[1] After the four men were blindfolded, a numbered disk was pasted on each of their foreheads.

[2] The men were then truthfully told: "Each of you has either a 1, a 2, or a 3 on your forehead, and the sum of your numbers is either 6 or 7."

[3] After the blindfolds were removed, each man in turn was asked to name the number on his forehead without seeing it.

[4] The question was repeated until only one man failed to name the number on his forehead.

[5] When it was logically possible to name the number on his forehead, each man did so; when it was not logically possible to name the number on his forehead, each man said, "I do not know the number," and waited until the question was repeated to him next time around.

[6] The first man and the second man each had a 2 on his forehead, and the third man and the fourth man each had a 1 on his forehead.

Which man failed to name his number: the first man asked, the second man asked, the third man asked, or the fourth man asked?

Hint on page 42;
Solution on pages 96-97.

The Four Lettered Disks

Four women were seated around a table.

[1] After the four women were blindfolded, a lettered disk was pasted on each of the foreheads.

[2] The women were then truthfully told: "Each of you has either an A, a B, an S on your forehead, and the letters spell either ASEA, BASS, BEES, BABE, or BASE when rearranged.

[3] After the blindfolds were removed, each woman in turn was asked to name the letter on her forehead without seeing it.

[4] The question was repeated until only one woman failed to name the letter on her forehead.

[5] When it was logically possible to name the letter on her forehead, each woman did so; when it was not logically possible to name the letter on her forehead, each woman said, " I do not know the letter," and waited until the question was repeated to her next time around.

[6] The first woman had a B on her forehead, the second woman had an A, the third woman had an E, and the fourth woman had an S.

Which woman failed to name her letter: the first woman asked, the second woman asked, the third woman asked, or the fourth woman asked?

Hint on page 42;
Solution on pages 98-99.

Ten Short Stories

Solution Schemes

Sixteen Grades

Substitute 'Ramona', 'Sophia', 'Tamara' and 'Ursula' for each of 'Record 1', 'Record 2', 'Record 3', and 'Record 4' so that (2) through (5) are not contradicted.

Seven Numbers

Copy the diagram that appears in the puzzle. Then write a number in each circle so that no condition is contradicted.

Bank Robber's Nationality

Copy the chart that appears in the puzzle. Then cross off entries in the chart, to indicate incorrect information, so that (7) and (8) are not contradicted.

The Test

Copy the chart that appears in the puzzle. Then circle the correct answer to each question so that (2) is not contradicted.

Big Word

Make a chart for yourself as follows:

Ordered letters of the big word								
"Other" letters								

Write one letter in each box so that no condition is contradicted.

Secret Word

Make a chart for yourself as follows:

Letter in the secret word							
Frequency of that letter in the seven given words							

Write a letter in each box in the top row and a number in each box in the bottom row, crossing off any unused boxes, so that no condition is contradicted.

Letter Multiplication

Make a chart for yourself as follows:

16 x 5 x 14 = ___x___x___ x___x___x___

Write one number in each blank to indicate letters that do not contradict the conditions.

Word Addition

Make a chart for yourself as follows:

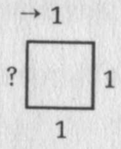
$$\begin{array}{rcccccc} & \square & \square & \square & \square & \square & \square \\ + & \square & \square & \square & \square & \square & \square \\ \hline & 9 & 2 & 5 & 7 & 6 & 4 \end{array}$$

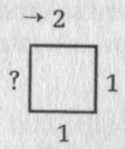
Write a digit in each box, to discover its corresponding letter, so that no condition is contradicted.

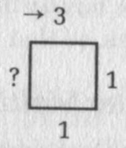
Hints

The Four Numbered Disks

Assume the men are questioned in a clockwise order. Then the man at the arrow, who is the man clockwise adjacent to the man at the question mark, knows that the man at the question mark sees either:

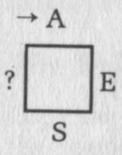


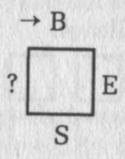


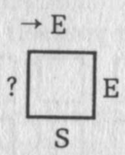


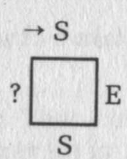
The Four Lettered Disks

Assume the women are questioned in a clockwise order. Then the woman at the arrow, who is the woman clockwise adjacent to the woman at the question mark, knows that the woman at the question mark sees either:









The Mystery Writers

Prologue

Many mystery writers assembled on an estate one weekend for a symposium on mystery writing.

[1] Some of the mystery writers had won only the award for 'Best Mystery Novel of the Year' and the rest of the mystery writers had won only the award for 'Best Mystery Short Story of the Year'.

[2] A curious thing happened that weekend: Any statement made by a mystery writer who had won the award for Best Novel was true; any statement made by a mystery writer who had won the award for Best Short Story was false.

Part One: The Diarist

One of a group of five writers of police procedurals kept a diary.

[1] After the theft of the diary, the five writers of police procedurals made the following statements.

Arden: The diarist is Clark or Edson.

Brent: The diarist's room is not next to a room whose occupant has won the award for Best Novel.

Clark: The diarist is Arden or Dewey.

Dewey: The diarist's room is not next to a room whose occupant has won the award that the diarist has won.

Edson: Exactly three of us five have won the award for best Short Story.

[2] The five writers of police procedurals had these connected rooms on the estate:

bath	*Arden*	*Brent*	*Clark*	*Dewey*	*Edson*	bath

Who was the diarist?

Solution Scheme on page 48;
Solution on pages 100-101.

Part Two: The Arsonist

A stolen diary revealed that one of a group of five writers of British mysteries was an arsonist.

[1] After the theft of the diary, the five writers of British mysteries made the following statements.

Foster: The arsonist was Harley.

Gordon: The arsonist's room is next to at least one room whose occupant has won the award for Best Short Story.

Harley: If the arsonist has won the award for Best Novel, then the arsonist was Foster or Judson.

Ingram: Exactly three of us five have won the award for Best Short Story.

Judson: If the arsonist has won the award for Best Short Story, then the arsonist was Gordon or Ingram.

[2] The five writers of British mysteries had these connected rooms on the estate:

bath	*Foster*	*Gordon*	*Harley*	*Ingram*	*Judson*	bath

Who was the arsonist?

Solution Scheme on page 48;
Solution on pages 102-103.

Part Three: The Thief

One of a group of five writers of hard-boiled mysteries stole a diary.

[1] After the theft of the diary, the five writers of hard-boiled mysteries made the following statements.

Kirby: Of our five rooms, no adjacent ones have occupants who have won the award that I have won.

Logan: At least two of us five have won the award that I have won.

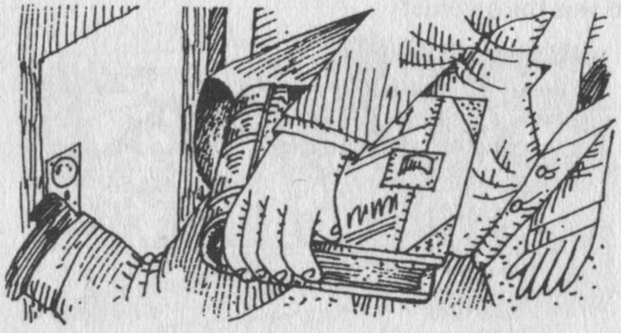
Nevin: The thief's room is not next to a room whose occupant has won the award that I have won.

Orval: The award that the thief has won is the award that I have won.

[2] The five writers of hard-boiled mysteries had these connected rooms on the estate:

bath	*Kirby*	*Logan*	*Mason*	*Navin*	*Orval*	bath

Who was the thief?



Solution Scheme on page 49;
Solution on page 103.

Part Four: Death of a Mystery Writer

When the identity of an arsonist, which was revealed in a stolen diary, became known to one of a group of five writers of historical mysteries, that writer of historical mysteries murdered the arsonist. The symposium was then discontinued.

[1] After the murder, the five writers of historical mysteries made the following statements.

Preston: If the award that the murder has won is the award that I have won, then the murderer is Quentin or Sanford.

Quentin: If the award that the murderer has won is not the award that I have won, then the murderer's room is next to at least one room whose occupant has won the award that I have won.

Raleigh: The murderer is Preston or Thurman.

Sanford: The murderer is Preston or Raleigh.

Thurman: Of our five rooms, no adjacent ones have occupants who have won the award that I have won.

[2] The five writers of historical mysteries had these connected rooms on the estate:

bath	*Preston*	*Quentin*	*Raleigh*	*Sanford*	*Thurman*	bath

Who was the murderer?

Solution Scheme on page 49;
Solution on pages 104-106.

The Mystery Writers

Solution Schemes

Part One: The Diarist

Make a chart for yourself as follows:

	True	False
Arden's Statement		
Brent's Statement		
Clark's Statement		
Dewey's Statement		
Edson's Statement		

Place X's in the appropriate boxes of the chart so that (I), (II), and (2) are not contradicted.

Part Two: The Arsonist

Make a chart for yourself as follows:

	True	False
Foster's Statement		
Gordon's Statement		
Harley's Statement		
Ingram's Statement		
Judson's Statement		

Place X's in the appropriate boxes of the chart so that (I), (II), and (2), are not contradicted.

Part Three: The Thief

Make a chart for yourself as follows:

	True	False
Kirby's Statement		
Logan's Statement		
Mason's Statement		
Nevin's Statement		
Orval's Statement		

Place X's in the appropriate boxes of the chart so that (I), (II), and (2), are not contradicted.

Part Four: Death of a Mystery Writer

Make a chart for yourself as follows:

	True	False
Preston's Statement		
Quentin's Statement		
Releigh's Statement		
Sanford's Statement		
Thurman's Statement		

Place X's in the appropriate boxes of the chart so that (I), (II), and (2), are not contradicted.

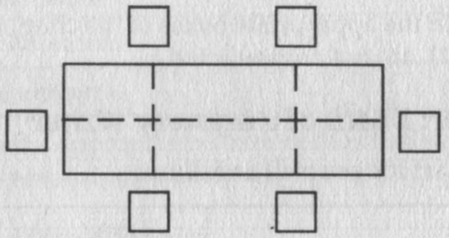
The Gourmet Diners

Prologue

Some men and women formed a club of gourmet diners that met for dinner once a month.

[I] The gourmet diners were three women — April, Carla, and Ellen and three men — Basil, Derek, and Felix.

[II] At each dinner, the chairs in which they sat were arranged this way around a table.



Part One: The President of the Club

At the first dinner:

[1] Each of April and Basil sat on a woman's immediate left.

[2] Each of Carla and Derek sat on a man's immediate right.

[3] Each of Ellen and Felix sat directly across from a man.

[4] The president of the club sat on a woman's immediate left and directly across from a man.

Who was the president of the club?

Solution Scheme on page 54;
Solution on pages 106-107.

Part Two: The Suspected Poisoner

At the third dinner, when Basil tried to get everyone to recall the seating arrangement at the second dinner, the following statements were made in the order given.

[1] April: I sat on Basil's immediate right.

[2] Carla: I sat on a man's immediate left, but it was not Basil's.

[3] Ellen: I sat on a woman's immediate left.

[4] Basil: I sat on the immediate right of a woman (he said aloud) who I suspect tried to poison my drink at the second dinner (he said to himself).

[5] Derek: I sat on the immediate right of a woman who has lied.

[6] Felix: I did not sit next to a woman who has lied.

It turned out:

[7] Each man told the truth.

Whom did Basil suspect of trying to poison his drink?

Solution Scheme on page 54;
Solution on pages 108-109

Part Three: The Recipe

At the seventh dinner:

[1] Reading clockwise from the right end, the seating arrangement was Ellen, Derek, Basil, April, Felix, and Carla.

[2] One of the six was the cook and another of the six gave cook the recipe for the dessert.

[3] The cook and the recipe giver did not sit next to each other.

[4] If the cook and the recipe giver sat directly across from each other, then the cook was a man.

[5] If the cook and the recipe giver were separated by one person, then the recipe giver was a man.

[6] If the cook and the recipe giver were separated by two persons, then the recipe giver was a woman.

[7] If you knew who the recipe giver was at this point, then you would not know who the cook was.

Who was the recipe giver?

Solution Scheme on page 55;
Solution on pages 109-110.

Part Four: Death of a Gourmet Diner

At the ninth dinner, April was murdered. An investigation of her murder led to a consideration of the following five propositions.

[1] If two women sat directly across from each other, then Basil was the murderer and sat on April's immediate left.

[2] If two men sat directly across from each other, then Carla was the murderer and sat on April's immediate left.

[3] If two women sat next to each other, then Derek was the murderer and sat directly across from April.

[4] If two men sat next to each other, then Ellen was the murderer and sat directly across from April.

[5] If every man sat next to a woman, then Felix was the murderer and sat on April's, immediate right.

It turned out:

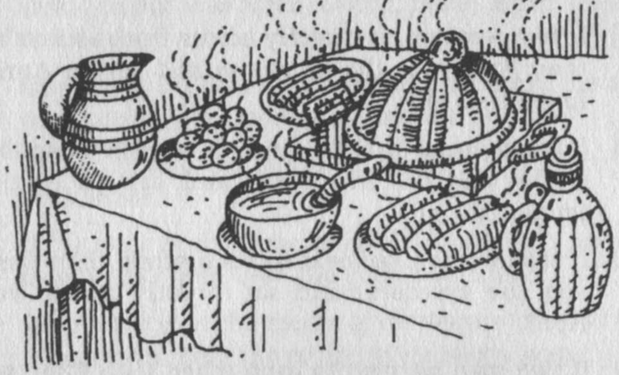
[6] Only four of the five propositions were true.

Who was the murderer?

Solution Scheme on page 55;
Solution on pages 110-112.

The Gourmet Diners

Solution Schemes



Part One: The President of the club

Copy the diagram that appears in the Prologue and place the diners around the table so that no condition is contradicted.

Part Two: The suspected Poisoner

Copy the diagram that appears in the Prologue and make a chart for yourself as follows:

	True	False
April's Statement		
Carla's Statement		
Ellen's Statement		

Place the diners around the table and put X in the appropriate boxes of the chart so that (7) is not contradicted and so that the suspects' statements are consistent with each other.

Part Three: The recipe

Make a chart for yourself as follows:

If the recipe giver was	then the cook could only be

Write a single name in each box so that none of [1] through [6] is contradicted; then use [7].

Part Four: Death of a Gourmet Diner

Copy the diagram that appears in the Prologue and make a chart for yourself as follows:

Hypothesis of [1] is	Conclusion of [1] is	[1] is
Hypothesis of [2] is	Conclusion of [2] is	[2] is
Hypothesis of [3] is	Conclusion of [3] is	[3] is
Hypothesis of [4] is	Conclusion of [4] is	[4] is
Hypothesis of [5] is	Conclusion of [5] is	[5] is

Write 'true' or 'false' in each box of the chart and place the diners around the table so that 6 is not contradicted. This means, in part, that only one of [1] through [5] has a false conclusion when its hypothesis is true.

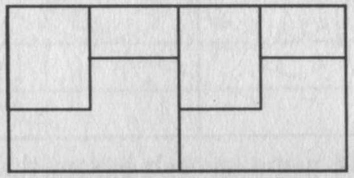
The Vacationers

Prologue

Six adults vacationed at the same hotel each summer.

[1] The six vacationers were a widower, his sister, and his son, his daughter (a widow), his daughter's daughter.

[2] Each of the six vacationers stayed in a different one of these rooms.



Part One: The Travel Agent

On their first vacation:

[1] The widower stayed in a room that did not border on either his son's or his daughter's room.

[2] The widower's daughter stayed in a room that did not border on either her son's or her daughter's room.

[3] Either each man had a room larger than his sister's room or each woman had a room larger than her brother's room.

[4] One of the six was a travel agent whose room was either the largest of the men's rooms or the largest of the women's rooms.

Who was the travel agent?

Solution Scheme on page 60;
Solution on pages 112-113.

Part Two: The Robbery

On their second vacation, a robbery occurred in the hotel. Six months later, when questioned about the rooms they occupied during the robbery:

[1] The three men agreed that each man's room bordered on exactly two woman-occupied rooms — a situation that subsequently proved to be correct.

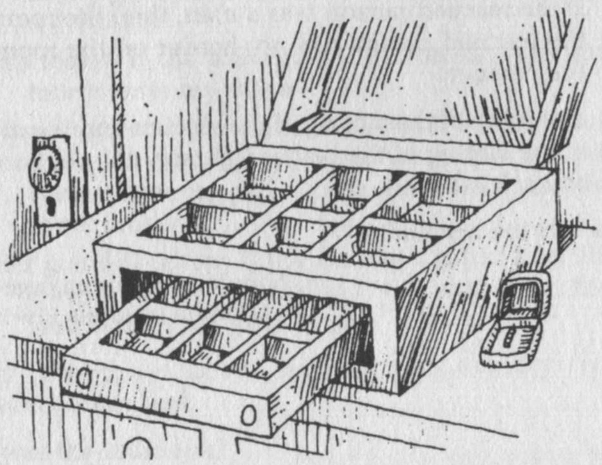
[2] The widower said, 'I stayed in a large room.'

[3] The widower's son said, 'I stayed in a medium-sized room.'

[4] The widower's grandson said, 'I stayed in a small room.'

[5] One of the three men, who was the only one mistaken about the size of the room he stayed in, became a suspect in the robbery.

Who became a suspect in the robbery?



Solution Scheme on page 60;
Solution on pages 114-116.

Part Three: The Rescue

On their third vacation:

[1] The rooms were occupied in the following way.

Left: small — widower's sister; medium — widower; large — widower's son.

Right: small — widower's granddaughter; medium — widower's grandson; large — widower's daughter.

[2] One of the six rescued one of the other five from drowning.

[3] If the rescuer and the rescued person were the opposite sex, then the rescued person had the larger of their rooms.

[4] If the rescuer and the rescued person were the same sex, then the rescued person had the smaller of their rooms.

[5] If the rescued person was a man, then the room of the rescued person did not border on the room of the rescuer.

[6] The room of the sibling of the rescuer and the room of the sibling of the rescued person did not border on each other.

Who was the rescuer?

Solution Scheme on page 60;
Solution on pages 116-117.

Part Four: Death of a Vacationer

On their fourth vacation:

[1] The rooms were occupied in the following way.

Left: small — widower's sister; medium — widower's granddaughter; large — widower's grandson.

Right: small — widower's daughter; medium — widower's son; large — widower.

[2] The widower was murdered by one of the other five vacationers.

[3] After the murder, the widower's relatives made the following statements.

His son: If the murderer's room is a different size from my dad's room, then murderer is my niece.

His grandson: If the murderer's room borders on the same number of other man-occupied rooms as my granddad's room, then the murderer is my mother.

His sister: If the murderer is a woman, then the murderer is my niece.

His daughter: If the murderer's room borders on a different number of other woman-occupied rooms from my dad's room, then the murderer is my brother.

His granddaughter: If the murder's room does not border on my granddad's room, then the murderer is my grandaunt.

[4] It turned out *not* to be true that exactly two vacationers lied.

Who was the murderer?

Solution Scheme on page 61;
Solution on pages 117-118.

The Vacationers

Solution Schemes

Part One: The Travel Agent

Copy the diagram that appears in the Prologue. Using symbols (such as M_1 for the widower, W_1 for his sister, M_2 for his son, W_2 for his widowed daughter, M_3 for his daughter's son, and W_3 for his daughter's daughter), place the vacationers in the hotel rooms so that no condition is contradicted.

Part Two: The Robbery

Copy the diagram that appears in the Prologue and make a chart for yourself as follows:

	True	False
Widower's Statement		
Widower's Son's Statement		
Widower's Grandson's Statement		

Place the three men and the three women in the hotel rooms and put X's in the appropriate boxes of the chart so that [1] and [5] are not contradicted.

Part Three: The Rescue

Using [1] through [4], form as many rescuer-rescued pairs as possible. Then use [5] and [6] to reduce the number of rescuer-rescued pairs to one.

Part Four: Death of a Vacationer

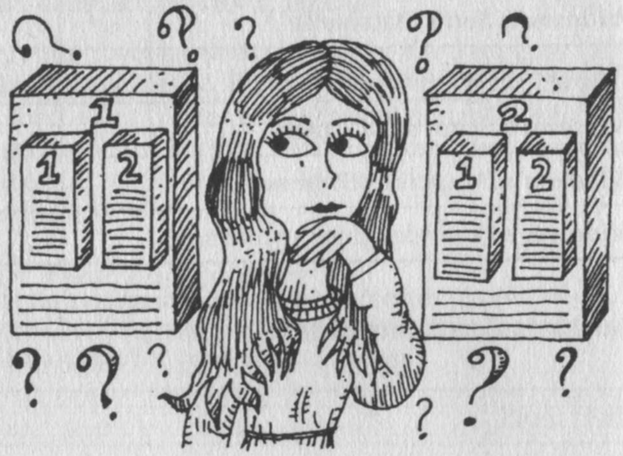
Make a chart for yourself as follows:

	True	False
Widower's Son's Statement		
Widower's Grandson's Statement		
Widower's Sister's Statement		
Widower's Daughter's Statement		
Widower's Granddaughter's Statement		

Put X's in the appropriate boxes of the chart so that [1], [2], and [4] are not contradicted.

Two "Novelettes"

The Portrait



To become eligible to marry the king's son, a woman had to solve the following puzzle, which was contrived by the king and was to be put together by two craftsmen who made wooden boxes. The craftsmen, Truman and Falstaff, duly made boxes so that:

[I] A. Whenever Truman made a box, he always inscribed only true statements on it.

B. Whenever Falstaff made a box, he always inscribed at least one false statement on it.

[II] A. Each of two large boxes — one inscribed with a 1 and the other inscribed with a 2 — contained two small boxes likewise inscribed.

B. Two windows in the large boxes allowed the small boxes to be seen.

[III] Three of the small boxes were empty and the fourth contained a portrait of the king's son.

[IV] A. Each box inscribed with a 1 was also inscribed with these three statements:

1. a. The portrait is in at least one box inscribed by me.

   b. The portrait is not in this box.

   c. At least one other box of this size was inscribed by me.

B. Each box inscribed with a 2 was also inscribed with these three statements:

2. a. The portrait is in at least one box inscribed by Falstaff.

   b. The portrait is in this box.

   c. At least one other box of this size was inscribed by me.

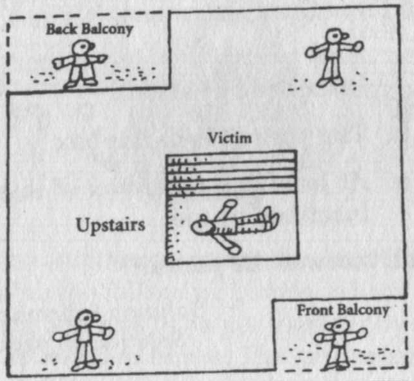
In which small box was the portrait?

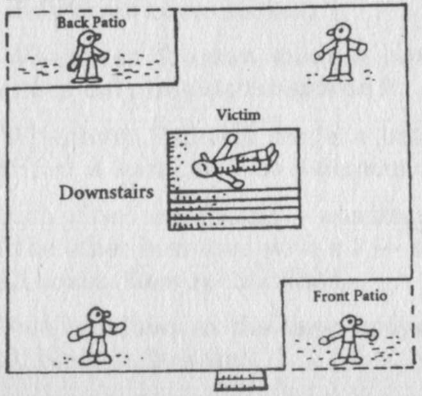
Solution Scheme on page 67;
Solution on pages 118-122.

Who killed Ty Coon?

Nine people were celebrating the birthday of Ty Coon at the Coon mansion. While they were playing a game called Murder, Ty Coon was really murdered.

[I] The location of the celebrants during the game of Murder (except for the few minutes when the game murder and the real murderer left his or her position, or their positions) are shown in the following two diagrams; the victim's location is shown in each diagram.





[II] After the victim was found stabbed on the stair landing in the middle of the mansion, each of the eight other people made three statements; the statements — agreed to before-hand — involved their whereabouts during the game of Murder, the identity of the game murderer, the identity of the real murderer, and whether or not some of them told the truth.

Arthur Coon, son of the victim, stated:
1. The game murderer was outdoors.
2. I was indoors.
3. None of the game murderer's statements is false.

Katherine Coon Davies, daughter of the victim, stated:
1. The game murderer or I, but not both of us, was at the front of the mansion.
2. Arthur and I were both upstairs.
3. At least one of the real murderer's statements is false.

Laura Bentley Coon, wife of the victim, stated:
1. The game murderer or I, but not both of us, was outdoors.
2. Arthur and I were both downstairs
3. At least one of the real murderer's statements is false.

Philip Lambert, business partner of the victim, stated:
1. I am not the game murderer.
2. None of the game murderer's statements is false.
3. Katherine or I, but not both of us, was upstairs.

Martha Grayson, secretary of the victim stated:
1. The game murderer or I, but not both of us, was outdoors.
2. Philip or I, but not both of us, was at the front of the mansion.
3. I am not the real murderer.

Beatrice Grayson Coon, the son's wife, stated:
1. The game murderer was indoors.
2. I was outdoors.
3. Martha and I were on the same floor level.

John Davies, the daughter's husband, stated:
1. None of the statements made by a person who was at the front of the mansion is false.
2. Martha and George were both indoors.
3. No. more than one of the real murderer's statements is false.

George Bentley, the wife's brother, stated:
1. None of the statements made by a person who was at the back of the mansion is false.
2. Katherine and John were both upstairs.
3. More than one of the real murderer's statements are false.

[III] One of the men (Arthur, Philip, John or George), was a police informant whose three statements were true.

Who killed Ty Coon?

Solution Scheme on page 68;
Solution on pages 123-128.

The Portrait

Solution Scheme

Note that when Falstaff makes a box and inscribes three statements on it, the number of true statements may be none, one or two.

To determine the small box in which the portrait is to be found, first decide whether the two boxes that contain the portrait have inscriptions such that both contain only true statements, one contains only true statements and one contains at least one false statement, or both contain at least one false statement. Then decide whether the two large boxes have inscriptions such that both contain only true statements, one contains only true statements and one contains at least one false statement, or both contain at least one false statement. Next decide which large box the portrait is in. Finally, decide which small box the portrait is in.

When completed, the solution will reveal which of the eighteen statements in the inscriptions are true and which are false.

Who Killed Ty Coon?

Solution Scheme

By comparing the suspects' statements with each other, first determine the number of suspects who made three true statements. Then make two charts for yourself as follow:

	Front or back?	Inside or outside?	Downstairs or upstairs?
Arthur Coon			
Katherine Davies			
Laura Coon			
Philip Lambert			
Martha Grayson			
Beatrice Coon			
John Davies			
George Bentley			

	Statement 1	Statement 2	Statement 3
Arthur Coon			
Katherine Davies			
Laura Coon			
Philip Lambert			
Martha Grayson			
Beatrice Coon			
John Davies			
George Bentley			

Write 'front', 'back', 'inside', 'outside' 'downstairs', or 'upstairs' in each appropriate box of the first chart and write 'true' or 'false' in each box of the second chart so that (I) and (III) are not contradicted and so that the suspects' statements are consistent with each other.

The Choir

Part One: The Accuser

The following reasoning uses [I], [II], and [1].

Suppose the accuser lied. Then Doreen told the truth and was not the accuser. Then: (i) if Bertha told the truth, then the accuser was Astrid or Cheryl, from [2]; then Bertha lied. (ii) If Bertha lied, then neither Astrid nor Cheryl was the accuser, from [2]; then Bertha was the accuser; then Cheryl lied; then Bertha told the truth. So, in (i) if Bertha told the truth, then Bertha lied; and in (ii) if Bertha lied, then Bertha told the truth. Since each of these situations is impossible, the accuser told the truth.

Then: Astrid was not the accuser because, if she told the truth, then Bertha was the accuser; Cheryl was not the accuser because, if she told the truth, then Astrid was the accuser; Doreen was not the accuser because she lied — she could not have told the truth. So *Bertha was the accuser.* Then Astrid told the truth and Cheryl lied.

Part Two: The Accused

The following reasoning uses [I], [II], and [1].

Suppose Giles lied. Then Edgar, Frank, and Homer all told the truth. Then Frank or Giles was the accused because either Edgar's or Homer's hypothesis was true; and Homer was the accused, because Frank told the truth and from [2]. This situation is impossible, so Giles told the truth.

Either Edgar's hypothesis or Homer's hypothesis was false, so at least one of Edgar and Homer told the truth. Then, since Giles told the truth, Frank lied and either Edgar or Homer lied.

Suppose Homer lied. Then Edgar was the accused. But, because Frank lied and from [2], Edgar was not the accused. So Homer told the truth.

Then Edgar lied, because either he or Homer lied. Since Edgar lied, *Homer was the accused.*

Part Three: The Eavesdropper

The following reasoning uses [I], [II], and [1].

If Joyce lied, then she was the only one who lied and, at the same time, Irene did not tell the truth. This situation is impossible. So Joyce told the truth.

Then: if Irene told the truth, then Karen and Lydia both lied; and if Irene lied, then Karen and Lydia both lied. So Karen and Lydia both lied in any case. Then, since Joyce told the truth, Irene told the truth.

Then, because Lydia lied and from [2], *Irene was the eavesdropper.*

Part Four: Death of a Choir Member

The following reasoning uses [I], [II], and [1].

Suppose Mark lied. Then his hypothesis was true and his conclusion was false. Then the murderer told the truth and the murderer's room was not next to a liar's room. Then Mark was not the murderer and, from (2), Neal was not the murderer. The either Owen or Paul was the murderer. Suppose Paul was the murderer; then Paul told the truth and his conclusion was false; then his hypothesis was false; but, because he was the murderer, his hypothesis was true. This situation is impossible, so Owen was the murderer. Then Owen told the truth, and Paul told the truth because his conclusion was true. Then, from [2], Neal did not tell the truth, so Neal lied. Then, from [2], because Owen's room was next to a choir member who was to sing in either symphony, Mark's conclusion was true. Then Mark told the truth. So if Mark lied, then he told the truth. This situation is impossible, so Mark told the truth.

Then Neal did not tell the truth, from [2]; so Neal lied. Then Owen lied, from [2], because either Owen and Neal both lied, or Owen and Paul both lied. Then either Neal or Paul was the murderer.

Suppose Paul was the murderer. Then Paul lied because his hypothesis was true and his conclusion was false. Then Mark's hypothesis was true and, because it has already been established that Owen lied, his conclusion was false. Them Mark lied. But it has already been established that Mark told the truth. This situation is impossible, so Paul was not the murderer.

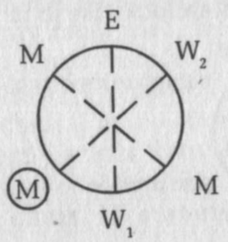
Then *Neal was the murderer.* Then Paul told the truth because his conclusion was true, Paul's hypothesis was false, while Mark's hypothesis and conclusion were both true.

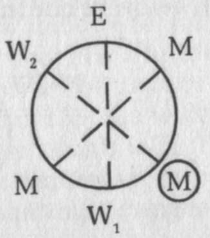
The Card Players

Part One: The Scorekeeper

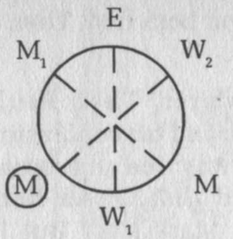
The following reasoning uses [I] and [II].

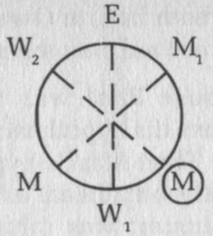
Let M represent a man, W_1 represent one woman, W_2 represent the other woman, and E represent the empty chair. Then, from [1], the men and women were seated around the table in one of the following two ways, with the scorekeeper's symbol circled.





Let M_1 represent the husband of W_1. Then, from [2], the two ways may be further clarified as shown below.





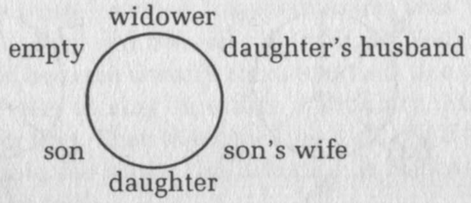
Then, from [2], the scorekeeper must be the husband of W_2.

Then, from [3], M_1 cannot be the widower's son, since he is younger than the widower, so it must be the widower's daughter's husband. So *the scorekeeper was the widower's son.*

Part Two: The Cheater

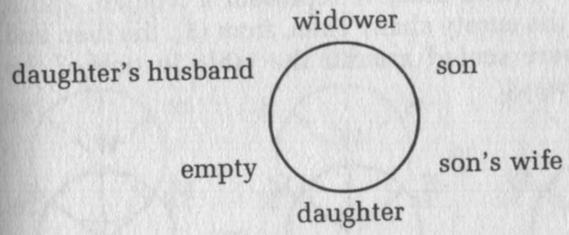
The following reasoning uses [I] and [II].

Suppose the widower's daughter's husband is the cheater and the only man who lied, from [4] and [6]. Then, from [1], the widower sat directly across from his daughter. Then, from [5] and [6], the widower's daughter's husband sat next to the widower. Then, from [2], the widower's son sat directly across from the widower's daughter's husband. Then, from [3], the widower sat next to the empty chair. Then the widower's daughter's husband sat next to the widower's son's wife. In summary, the seating arrangement would be the one shown below or one that is counterclockwise to it.



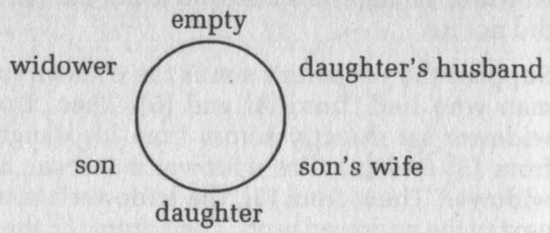
Since this arrangement has the widower's daughter's husband as the cheater, it contradicts [5]. So the widower's daughter's husband is not the cheater and he did not lie.

Suppose the widower's son is the cheater and the only man who lied, from [4] and [6]. Then, from [1], the widower sat directly across from his daughter. Then, from [5] and [6], the widower's son sat next to the widower. Then, from [3], the widower's son's wife sat next to the widower's son. Then, from [2], the widower's son sat directly across from the empty chair. Then the widower's daughter's husband sat next to the widower. In summary, the seating arrangement would be the one shown below or one that is counterclockwise to it.



Since this arrangement has the widower's son as the cheater, it contradicts [5]. So the widower's son is not the cheater and he did not lie.

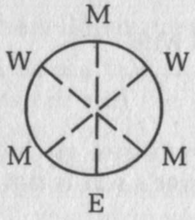
Then, from [4] and [6], the widower lied and *the cheater was the widower.* Then the widower's daughter's husband and the widower's son both told the truth; so, from [3], the widower's daughter's husband sat next to the empty chair and, from [2], the widower's son sat directly across from the widower's daughter's husband. Then, from [5] and [6], the widower sat next to the empty chair. Then — from [1], [4], and [6] the widower sat directly across from the widower's son's wife. Then the widower's daughter sat directly across from the empty chair. In summary, the seating arrangement would be the one shown below or one that is counterclockwise to it.



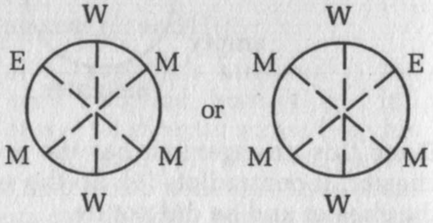
Part Three: The Empty Chair

The following reasoning uses [I] and [II].

Let M represent a man, W represent a woman, and E represent the empty chair. Then, from [5], the men and women were seated around the table in one of the following ways.



Case i



Case ii

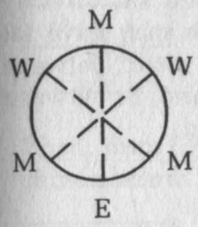
In case i: Each woman sat directly across from a man. So, from [4], the widower's son's wife sat directly across from the widower. But, since the widower sat directly across from a woman, he sat directly across from his daughter, from [3]. This situation is impossible. So case i is not the correct one.

Then Case ii is the correct one. From [1], if the widower's son sat directly across from a man, then the widower's son sat directly across from the widower's daughter's husband. Then the widower's daughter's husband sat directly across form the widower's son, contradicting [2]. So the widower's son did not sit directly across from a man, but t*he widower's son sat directly across from the empty chair*. Then the widower's daughter's husband sat directly across from the widower and from [2], next to the widower's son. Then each woman sat in either one of the two remaining positions.

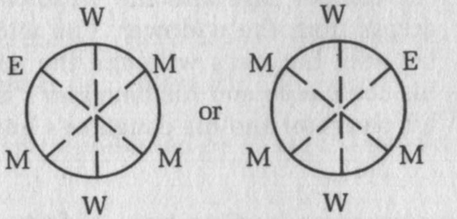
Part Four: Death of a Card Player

The following reasoning uses [I] and [II].

Let M represent a man, W represent a woman, and E represent the empty chair. Then, from [2], the men and women were seated around the table in one of the following ways.



Case i



Case ii

In both Case i and Case ii: If the widower's son and the widower's son's wife both told the truth in [5] and [6], then the hypothesis in their statements must be false; so the widower sat directly across from the empty chair. Then the hypothesis in the widower's daughter's statement and in the widower's daughter's husband's statement, in [3] and [4], must be false; so all four suspects told the truth. This situation contradicts [1] and [7]; so either the widower's son in [5] lied or the widower's son's wife in [6] lied. Then the hypothesis in [5] and [6] is true and someone sat directly across from the widower.

If the widower's son lied in [5], then Case ii cannot be the correct case because the widower's son's wife would also have lied in [6], contradicting [1] and [7]. So Case i is the correct case. Since someone sat directly across from the widower, the widower sat directly across from a woman, namely the widower's son's wife, who told the truth in [6]. Then the widower sat next to only one person (and the empty chair), and that person must have been his daughter. So, from [3], the widower's daughter also lied. This situation is impossible because it contradicts [1] and [7].

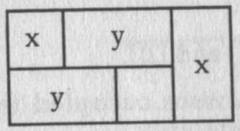
So the widower's son's wife lied and, from [1] and [7], *the murderer was the widower's son's wife.* Then, since someone sat directly across from the widower and the widower's daughter's husband told the truth, Case ii is the correct case and the widower's son sat directly across from the widower. The widower may have sat between his son's wife and the empty chair, between his son's wife and his daughter's husband, or between his daughter and his daughter's husband.

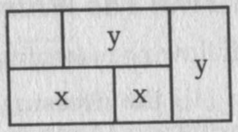
Company of Actors

Part One: The Playwright

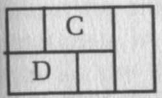
The following reasoning uses [I] and [II].

From [2] and [3], if Anita and Brian are each in a room shown below marked with an x, then Chloe and David are each in a room shown below marked with a y.

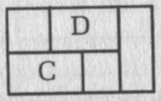




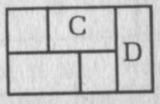
So either Chloe or David is in the large room that borders on all the other rooms, and the other is in a large room also; see below (C represents Chloe and D represents David).



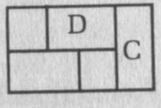
Case i



Case ii

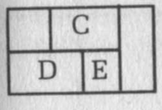


Case iii

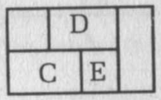


Case iv

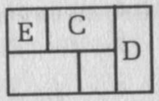
Then, from [2], Ellen (represented by E) is in the room shown below.



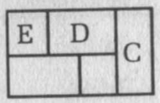
Case i



Case ii

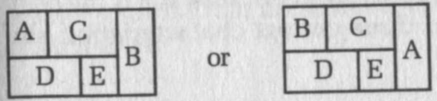


Case iii

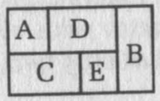


Case iv

From [4], Cases iii and iv are eliminated, and Cases i and ii are as shown below (A represents Anita and B represents Brian).



Case i



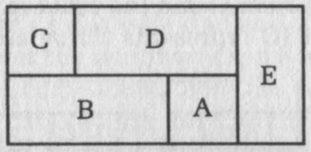
Case ii

Then, from [1], both parts of Case i are eliminated – because more than one room borders on exactly two other woman-occupied rooms (Brian's and Chloe's, all except Brian's) – and *Chloe was the playwright.*

Part Two: The Whistler

The following reasoning uses [I] and [II].

From [I], the dressing rooms were occupied in the following way (A represents Anita, etc)



From [2] and [3] and assuming each actor in turn was the whistler, the truth or falsity of each characteristic is as follows (t represents true and f represents false).

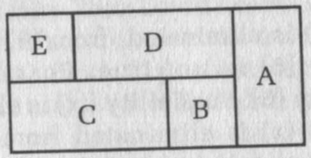
Actor as Whistler	Characteristic i	ii	iii	iv	v
Anita	f	t	f	t	t
Brian	t	f	t	t	f
Chloe	f	t	f	t	f
David	t	f	t	f	t
Edith	t	t	f	t	f

From [4], *Chloe was the whistler* because she is the only actor with other than three correct characteristics; she has only two.

Part Three: The Director

The following reasoning uses [I] and [II]:

From [I], the dressing rooms were occupied in the following way (A represents Anita, etc.).



From [2], the director had a sibling. So if both hypotheses in [4] and [6] are true, then both conclusions cannot be true (they are contradictory); and if the hypothesis in [6] is true, then the hypothesis in [4] is true. So the hypothesis in [6] is not true and (a) the dressing room of the director did not border on more rooms than the dressing room of the director's sibling. Then, from [1], the director was not David.

Suppose that the director and the director's sibling had rooms that bordered on each other. Then, from (1) and (3), the possibilities for director and director's sibling are the following (B represents Brian etc.)

	(i)	(ii)	(iii)	(iv)
Director	B	B	C	E
Director's sibling	A	C	E	C

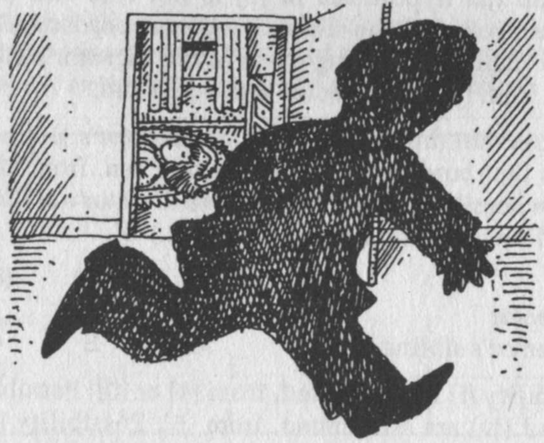
Possibility (i) is eliminated, from [4] or [5]. Possibilitie (ii) and (iv) are eliminated, from [5]. Possibility (iii) i eliminated, from [6]. So (b) the director and th director's sibling had dressing rooms that did not bord on each other.

Then, from (a) and (b), the possibilities for director and director's sibling are the following (A represents Anita, etc.).

	(v)	(vi)	(vii)	(viii)	(ix)	(x)
Director	A	A	B	C	E	E
Director's sibling	C	E	E	A	A	B

Possibility (vii) is eliminated, from [4] or because the hypothesis in [6] is not true. Possibility (viii) is eliminated, from [6]. Possibility (ix) is eliminated, from [5]. Possibility (x) is eliminated from (4). So either possibility (v) or (vi) is correct and *Anita was the director*. Then the director's sibling was either Chloe or Edith.

Part Four: Death of an Actor



The following reasoning uses [I] and [II].

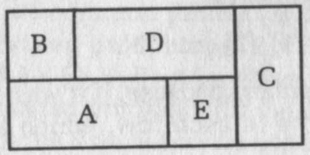
From [3], since three actors lied, at least three of the hypotheses in [2] are true; so the murderer of Edith is one of the other four actors.

In [2], the hypothesis of Brian's statement contradicts the hypothesis of Chloe's statement; so one of these hypotheses is true and the other is false. If Chloe's hypothesis is the false one, then her statement is the only true one, from [3]. Then Brian's hypothesis must be true and his conclusion must be false. But if Brian's conclusion is false, then David's conclusion must be true, so that David's statement is true. This situation contradicts (3) (both Chloe's statement and David's statement are true). So it is Brian's hypothesis that is the false one and his statement is the only true one. Then, from (3), all of Anita's, Chloe's and David's hypotheses are true and all of their conclusions are false. Then, since David's conclusion is false, Brian's conclusion is true.

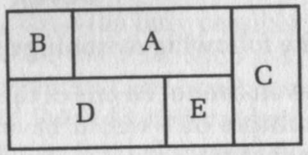
Since Anita's conclusion is false, Anita's room and David's room are the same size. Then, from [1], Anita and David both have large rooms.

Since Brian's conclusion is true, Brian's room and David's room are different sizes. So Brian has a small room, the one that is not Edith's.

Then, since Chloe's conclusion is false, Chloe's room does not border on Brian's room. So the rooms are occupied in one of the two ways shown below (A represents Anita, etc.).



Case i



Case ii

Since both of Anita's and David's hypotheses are true, the murderer's room and the victim's room border on the same total number of other rooms, namely three. So, looking only at this total number of other rooms, the murderer is Anita in Case i and David in Case ii. Edith's room borders on one other man-occupied room and two other woman-occupied rooms in each case, but only in case ii does the murderer's room border on one other man-occupied room and two other woman-occupied rooms. So Case ii is the correct one and *David was the murderer.*

Sixteen Grades

From [1] and [4], Tamara and Ursula each had two B's or two C's. But, from [1], if Tamara and Ursula each had two B's, then Ramona and Sophia each had C's; this situation is impossible, from [2]. So Tamara and Ursula each had two C's.

Then, from [1], Ramona and Sophia each had two B's. Then, from [1] and [3], Tamara had Record 1. Then, from [1] and because Ursula had two C's, Ursula had Record 2. Then, from [1] and [5], Ramona had Record 4. So *Ramona had the only A.* Then, from [1], Sophia had Record 3.

Seven Numbers

The following reasoning uses [1], [2], and [3].

Seven cannot be one of the numbers because, if it was, a multiple of 7 would have to be in each row, which is impossible.

If each of 8 and 9 was one of the numbers, then the common product would have to be a multiple of 8 x 9, or 72. That multiple would have to be at least 5 x 72, or 360, because a seventh number – 5 or 10 – would need to be placed in a circle (besides 2, 3, 4, 6, 8, and 9). But if 360

was the common product, then no number could be less than 4 (because no number in [1] is greater than 10). Then 2, 3 and 7 would all be excluded and the seven required numbers could not be obtained.

So either 8 or 9 was not one of the numbers. Then either:

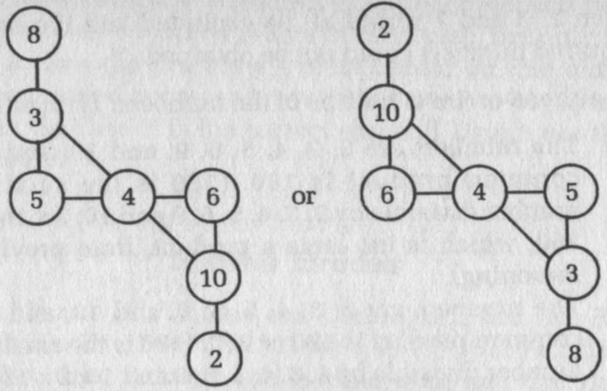
i) The numbers are 2, 3, 4, 5, 6, 9, and 10; and the common product is 180. (180 is the smallest number divisible by 2, 3, 4, 5, 6, 9 and 10; 2 x 180 is 360, which is too large a product, from previous reasoning).
ii) The numbers are 2, 3, 4, 5, 6, 8, and 10; and the common product is 120 or 240. (120 is the smallest number divisible by 2, 3, 4, 5, 6, 8 and 10; 2 x 120 is 240; 3 x 120 is 360, which is too large a product, from previous reasoning).

If (i) is true, then the only possible indicated products are 2 x 9 x 10, 3 x 6 x 10, and 4 x 5 x 9; this situation is impossible because four such products are needed. So (i) is not true.

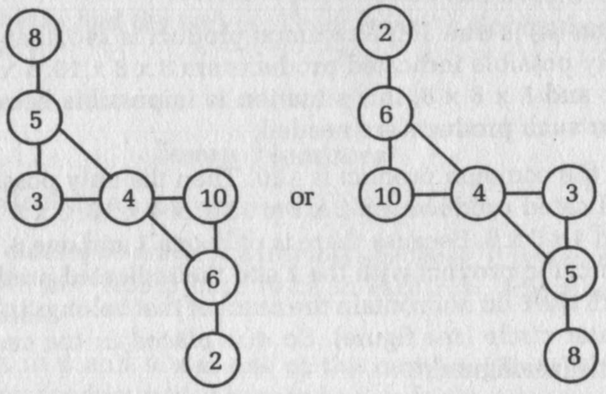
Then (ii) is true. If the common product is 240, then the only possible indicated products are 3 x 8 x 10, 4 x 6 x 10, and 5 x 6 x 8; this situation is impossible because four such products are needed.

So the common product is 120. Then the only possible indicated products are 2 x 6 x 10, 3 x 4 x 10, 3 x 5 x 8, and 4 x 5 x 6. Because there is only one 2 and one 8, the indicated product with the 2 and the indicated product with the 8 do not contain the number that belongs in the center circle (see figure). So *4 is placed in the center cycle* (see figure).

Any one of the following layouts is possible.



Case I



Case II

Bank Robber's Nationality

RRRRR
BANK
RRR

From [8], as many as fifteen correct choices are possible (two each for nationality, unusual feature, and colour of car; and three each for the other particulars) in [1] through [6]. From [7], the number of correct choices is a multiple of six, but the number of choices cannot be six because each of the witnesses' six choices in [5] is the same as another witness's choice. So the number of correct choices is twelve, each witness getting two. The following reasoning uses [1] through [6].

i) Assume the robber was only one of the following: 40 to 50 years old, 68 to 72 inches tall, or 190 to 210 pounds. Then the greatest number of correct choices can only be eleven (two each for nationality, unusual feature, and colour of his car, and a total of five for age, height, and weight). This situation is impossible because the number of correct choices is twelve.

ii) Assume the robber was all three: 40 to 50 years old, 68 to 72 inches tall, and 190 to 210 pounds. Then the witness in [5] was correct three times. This situation is impossible because each witness was correct only twice.

So from (i) and (ii), the robber was exactly two of the following: 40 to 50 years old, 68 to 72 inches tall, and 190 to 210 pounds

Then the witness in [5] was wrong in nationality unusual feature, and colour of his car. Then, because the unusual feature and the colour of his car must occur twice to get a total of twelve correct choices, the unusual feature was a lisp and the colour of his car was brown. Then the robber was not both 40 to 50 years old and 68 to 72 inches tall, otherwise the witness in [3] was correct three times; so the correct weight was 190 to 210 pounds. Then the witness in [5] and the witness in [6] were both correct in height and wrong in age. Then *Italian was the nationality of the bank robber.* Then the age was 20 to 30 year old.

The Test

From [1], if Graham got six correct answers, then Harlow and Irving each got one correct answer; this situation is

impossible, from [2]. From [1], if Harlow got six correct answers, then Irving and Kermit each got two correct answers; this situation is impossible, from [2]. From [1], if Irving got six correct answers, then Graham and Jordan each got one correct answer; this situation is impossible, from [2]. From [1], if Jordan got six correct answers, then Graham and Harlow each got three correct answers; this situation is impossible, from [2]. From [1], if Kermit got six correct answers, then Graham and Harlow each got two correct answers; this situation is impossible, from [2]. From [1], if Lester got six correct answers, then Harlow and Irving each got three correct answers; this situation is impossible, from [2]. So no one got six correct answers.

Then, from [2], the number of correct answers must total 0 + 1 +2 + 3 + 4 + 5, or 15. Then: (i) The student who got no correct answers cannot be Harlow, Jordan, or Lester because the total number of correct answers cannot be the required 15 when the correct answer to III is t and the correct answer to VI is f. Because the t in III occurs only twice and the f in VI occurs only twice, the maximum total possible would be 14 (for I through VI: 2 + 2 + 2 + 3 + 3 + 2). (ii) The student who got no correct answers cannot be Kermit because the total number of correct answers cannot be 15 when Lester gets all of III through VI correct. The minimum total possible would be 16 (for I through VI: 1 + 1 + 4 + 3 + 3 + 4). (iii) The student who got no correct answers cannot be Graham because each of the other students would then have at least two correct answers, contradicting [2].

So – from [i], [ii], and [iii] – Irving got no correct answers. Then the correct answers to III through VI in order are t, f, t, t. Then Lester got only one correct answer, the answer to VI. Then Graham got five correct answers. So *Graham got the most correct answers.*

In summary, the correct answers in order are a, a, t, f, t, t and are shown below in circles.

	I	II	III	IV	V	VI
Graham	ⓐ	ⓐ	ⓣ	t	ⓣ	ⓣ
Harlow	b	b	f	ⓕ	f	ⓣ
Irving	c	c	f	t	f	f
Jordan	d	ⓐ	f	ⓕ	ⓣ	ⓣ
Kermit	b	c	ⓣ	ⓕ	ⓣ	f
Lester	d	d	f	t	f	ⓣ

Big Word

GAMES
BCFLZ
ALBU
CEGY
CHOS
AIWZ

From [1], either A or C has to be in the big word and either L or E has to be in the big word. So, from LACE in [3], the number of letters that the big word has in common with each of the words in [3] is two.

From LACE and CHAPEL in [3], H and P are not in the big word (the letters in LACE are contained in CHAPEL). So, from [1], I and T are in the big word.

Then, from TWIG in [3], W and G are not in the big word. So, from [1], O and B are in the big word.

Then – from POLICY in [3] — L, C, and Y are not in the big word. So — from [1], E, A, and U are in the big word.

Then, from QUIZ in [3], Q and Z are not in the big word. So, from [1], R and S are in the big word.

Then – from FRANK in [3] — F, N, and K are not in the big word. So – from [1] — M, X, and D are in the big word.

In summary: I, T, O, B, E, A, U, R, S, M, X, and D are the twelve letters in the big word. From [1] and [2], when the 'other' letters are arranged alphabetically, the letters of the big word appear above them. So *the big word is AMBIDEXTROUS.*

Secret Word

From [2], the letters of the secret word are to be found among the ten letters in PHONE and STAIR. So, from [1] and [3], there are four (2x2) different letters in the secret word.

From [1], the letters of the secret word occur 14 (7 x 2) times in the seven given words. So the four letters in the secret word must have frequencies that total 14 in the seven given words.

The letters of PHONE and STAIR have the following frequencies in the seven given words.

P	H	O	N	E		S	T	A	I	R
2	2	4	3	5		5	4	3	4	3

Since the largest frequency is 5, the smallest frequency is 2, and the total number of frequencies is 14, the set of four frequencies must be one of the following five sets. (i) 5, 5, 2, 2 (ii) 5, 4, 3, 2, (iii) 5, 3, 3, 3 (iv) 4, 4, 4, 2 (v) 4, 4, 3, 3, Because two frequencies are to be chosen from those for PHONE and STAIR, the possible sets of letters for the secret word are as follows. (Two frequencies must be chosen from each word.)

Case i. None

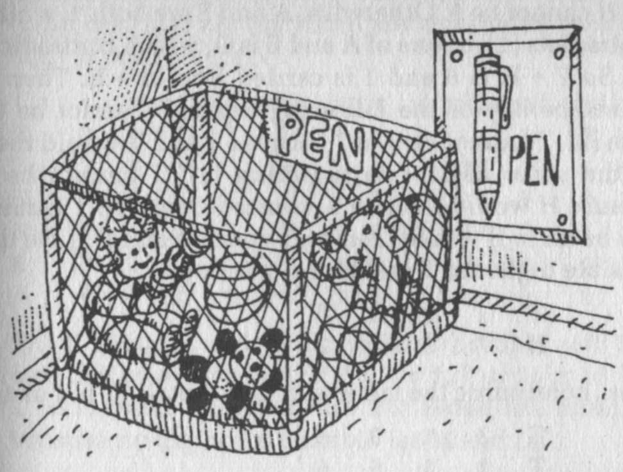
Case ii.

5	S	S	S	S	S	S	S	S	E	E	E	E	E	E	E	E
4	T	T	I	I	O	O	O	O	T	T	T	T	I	I	I	I
3	N	N	N	N	A	A	R	R	A	A	R	R	A	A	R	R
2	H	P	H	P	H	P	H	P	H	P	H	P	H	P	H	P

Case iii.	5	E	Case iv.	4	T	T	Case v.	4	O	O	O	O
	3	N		4	I	I		4	T	T	I	I
	3	A		4	O	O		3	N	N	N	N
	3	R		2	H	P		3	A	R	A	R

All the sets of letters listed above satisfy [2] and [3]. Only the set of four letters in the sixth column for Case ii satisfies [1]. So the letters A, O, P, and S are in the secret word. Only one familiar English word has these letters, so *the secret word is SOAP.*

Letter Multiplication



From [1], the child's first name has a 'product' that is equal to 16 x 5 x 14.

From [2], the name has no N(14); and it has no U(21) because its product is not a multiple of 3. So the name has a G(7).

From [2], the name has no E(5); it has no O(15) because its product is not a multiple of 3; and it has no Y(25) because its product is not a multiple of 25. So the name has either a J(10) or a T(20).

From [2], the name has no B(2) and no P(16). So, if the name has a J(10), then it has a D(4) twice; and, if the name has a T(20), then it has an H(8).

So, from [5] and the reasoning above, the letters in the name are either AADDGJ or AAAGHT.

Then, from [4], the name is either ADDJGA or AGATHA.

Then, from [3], *the first name of Pen Pen's child is AGATHA.*

Word Addition

T + H cannot be 9. Otherwise, A and E are both 1, which contradicts [1], or one of A and E is O, which contradicts [2]. So T + H is 8 and 1 is carried from A + E. Then T cannot be any of the following digits. T cannot be O, from [2]. T cannot be 2 or 7 because G and T would then be the same digit, contradicting [1]. T cannot be 4 because H would then be 4, contradicting [1]. T cannot be 8 because H would then be 0, contradicting [2]. So the possible digits for T and H are as follows:

T	1	3	5	6
H	7	5	3	2

Then, continuing the table with G so that G + T is 4 or 14:

G	3	1	9	8
T	1	3	5	6
H	7	5	3	2

Because 1 is carried from A + E, A + E is 11 or 12. Suppose A + E is 11. Then, using [1] to continue the table with A and E:

	i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii
G	3	3	3	3	1	1	1	1	9	9	8	8
T	1	1	1	1	3	3	3	3	5	5	6	6
H	7	7	7	7	5	5	5	5	3	3	2	2
E	2	9	5	6	2	9	4	7	4	7	4	7
A	9	2	6	5	9	2	7	4	7	4	7	4

Suppose A + E is 12. Then, using [1] to continue the table with A and E.

	xiii	xiv	xv	xvi	xvii	xviii	xix	xx	xxi	xxii
G	3	3	1	1	9	9	8	8	8	8
T	1	1	3	3	5	5	6	6	6	6
H	7	7	5	5	3	3	2	2	2	2
E	4	8	4	8	4	8	3	9	5	7
A	8	4	8	4	8	4	9	3	7	5

Then, using [1] and [2] to continue the table with N so that N + E is 6 or 16 (if G + T < 10), or 5 or 15 (if G + T >10; those case that are not listed are eliminated because no digit is possible for N):

	i	v	vi	vii	viii	ix	x	xi	xiii	xv	xvii	xviii
G	3	1	1	1	1	9	9	8	3	1	9	9
T	1	3	3	3	3	5	5	6	1	3	5	5
H	7	5	5	5	5	3	3	2	7	5	3	3
N	4	4	7	2	9	1	8	1	2	2	1	7
E	2	2	9	4	7	4	7	4	4	4	4	8
A	9	9	2	7	4	7	4	7	8	8	8	4

Then, using [1] and [2] to continue the table with M and L so that M + L is 4 or 5 (if A + E = 12), or 14 or 15 (if A + E =11; those case that are not listed are eliminated because no digits are possible for M and L):

	i	i	v	v	v	v	vi	vi	vii	vii	vii	vii	viii	viii	ix	ix	xi	xi
G	3	3	1	1	1	1	1	1	1	1	1	1	1	1	9	9	8	8
T	1	1	3	3	3	3	3	3	3	3	3	3	3	3	5	5	6	6
H	7	7	5	5	5	5	5	5	5	5	5	5	5	5	3	3	2	2
N	4	4	4	4	4	4	7	7	2	2	2	2	9	9	1	1	1	1
E	2	2	2	2	2	2	9	9	4	4	4	4	7	7	4	4	4	4
A	9	9	9	9	9	9	2	2	7	7	7	7	4	4	7	7	7	7
M	6	8	6	8	7	8	6	8	6	9	6	8	6	8	6	8	5	9
L	8	6	8	6	8	7	8	6	9	6	8	6	8	6	8	6	9	5

Then, using [1] and [2] to continue the table with I so that I + M is 7 or 17 (if N + E < 10), or 6 or 16 (if N + E > 10; those cases not listed are eliminated because no digits are possible for I):

	G	T	H	N	E	A	I	M	L
vii	1	3	5	2	4	7	8	9	6
vii	1	3	5	2	4	7	9	8	6

Then, because M + L must be 14, M is 8. Substituting the letters for the digits *9 2 5 7 6 4 is I N H A L E.*

The Four Numbered Disks

From [1], [2], and [6], these axioms hold:

Axiom I. When a man saw two 1s and one 2 on the other three men, he knew he had either a 2 or a 3 on his forehead.

Axiom II. When a man saw two 2s and one 1 on the other three men, he knew he had either a 1 or a 2 on his forehead.

From [1] through [5], as each man was asked in turn to name the number on his forehead, each man's reasoning in turn went as follows.

First man: I have a 2 or a 3 [from Axiom I]

Second man: I have a 2 or a 3 [from Axiom 1]. If I have a 2, the first man wouldn't know whether he had a 2 or a 3 [from Axiom I]. If I have a 3, the first man wouldn't know whether he had a 1 or a 2, from [2]. So I don't know whether I have a 2 or a 3.

Third man: I have a 1 or 2 [from Axiom II]. If I have a 1, the first man wouldn't know whether he had a 2 or a 3, and the second man wouldn't know whether he had a 2 or a 3 [see above]. If I have a 2, the first man wouldn't know whether he had a 1 or a 2 [from Axiom II], and the second man wouldn't know whether he had a 1 or a 2. The second man would reason: If I have a 1, the first man wouldn't know whether he had a 2 or a 3 [from Axiom I]; if I have a 2, the first man wouldn't know whether he had a 1 or a 2 (from Axiom II). So I don't know whether I have a 1 or a 2.

Fourth man: I have a 1 or a 2 [from Axiom II]. If I have a 2, the third man would know he had a 1, from [2]. The third man didn't know he had a 1. So I have a 1.

First man: I have a 2 or a 3 [from Axiom I]. If I have a 3, the third man would know he had a 1, from [2]. The third man didn't know he had a 1. So I have a 2.

Second man: I have a 2 or a 3 [from Axiom I]. If I have a 3, the third man would know he had a 1, from [2]. The third man didn't know he had a 1. So I have a 2.

Third man: I have a 1 or 2 [from Axiom II]. If I have a 2, the fourth man would know he had a 1, from [2]. If I have a 1, the fourth man would know he had a 1 [see above]. So I don't know whether I have a 1 or a 2.

(At this point no more information can be obtained by the third man.)

So the third man asked failed to name his number.

From [1], [2], and [6], these axioms hold:

Axiom I. When a woman saw A, B, and E on the other three women, she knew she had either an S or a B.

Axiom II. When a woman saw A, B and S on the other three women, she knew she had either an E or an S.

Axiom III. When a woman saw A, E, and S on the other three women, she knew she had either a B or an A.

Axiom IV. When a woman saw B, E, and S on the other three women, she knew she had either an A or an E.

From [1] through [5], as each woman was asked in turn to name the letter on her forehead, each woman's reasoning in turn went as follows.

First woman: I have a B or an A [from Axiom III].

Second woman: I have an A or an E [from Axiom IV]. If I have an E, the first woman would know she had a B, from [2]. The first woman didn't know she had a B. So I have an A.

Third woman: I have an E or an S [from Axiom II]. If I have an S, the first woman would know she had a B, from [2]. The first woman didn't know she had a B. So I have an E.

Fourth woman: I have an S or a B [from Axiom I]. If I have a B, the first woman wouldn't know whether she had a B or an S [from Axiom I]. If I have an S, the first woman wouldn't know whether she had a B or an A [see above]. So I don't know whether I have an S or a B.

First woman: I have a B or an A [from Axiom III]. If I have an A, the fourth woman would know she had an S. The fourth woman didn't know she had an S. So I have a B.

(The second and third women have already named their letters).

Fourth woman: I have an S or a B [from Axiom I]. If I have an S, the first woman would know the second time around that she had a B [see above]. If I have a B, the first woman would know the second time around that she had a B. The first woman would reason: If I have an S, the third woman wouldn't know whether she had an E or an S; but the third woman knew she had an E. So I don't know whether I have an S or a B.

(At this point no more information can be obtained by the fourth woman).

So the fourth woman asked failed to name her letter.

The Mystery Writers

Part One: The Diarist

The following reasoning uses [I], [II] and [1].

(i) Suppose Brent told the truth and was the diarist. Then, from [2], Arden and Clark both lied and, from [2], Dewey told the truth. Then Edson neither told the truth nor lied. Then Edson neither told the truth nor lied. This situation is impossible.

(ii) Suppose Brent told the truth and was not the diarist. Then either Arden or Clark lied and the other told the truth. Then Edson did not tell the truth, so Edson lied. Then, because Edson lied, Dewey told the truth. Then, because Brent told the truth and from [2], neither Arden, Clark, nor Edson was the diarist. Then Dewey was the diarist. Then Clark told the truth. But, Because Brent told the truth and from [2], Dewey was not the diarist. This situation is impossible.

So, from (i) and (ii), Brent lied. Then Arden was not the diarist because, from [2], Arden's room was not next to a room whose occupant told the truth.

Suppose Edson told the truth. Then only one of Arden, Clark, and Dewey told the truth. (iii) Suppose Dewey was the one who told the truth. Then, because Arden and Clark both lied, Brent was the diarist. Then Dewey lied. But this situation is impossible, so Dewey lied. Then, because Brent lied and from [2], Edson was not the diarist. (iv) Suppose Arden was the one who told the truth. Then, since it has already been established that Edson was not the diarist, Clark was the diarist. But this situation is impossible because Brent's statement would then be true. (v) Suppose Clark was the one who told the truth. Then, since it has already been established that Arden was not the diarist, Dewey was the diarist. But this situation is impossible because Dewey lied and from [2]. So, from (iii), (iv) and (v), Edson lied.

If Arden and Clark both lied, then Brent was the diarist; then, from [2], Brent told the truth. This situation is impossible because it has already been established that Brent lied. Then, since Arden and Clark did not both tell the truth, exactly one of them lied and Brent was not the diarist. Then, since it has already been established that Edson lied, Dewey lied. Then, since Brent lied – the diarist's room was next to the room of a writer who told the truth — and since Brent was not the diarist, Clark told the truth, from [2] (a room occupied by a writer who told the truth is needed next to another room besides Brent's). Then Arden lied and, since it has already been established that Arden was not the diarist, *Dewey was the diarist.*

Part Two: The Arsonist

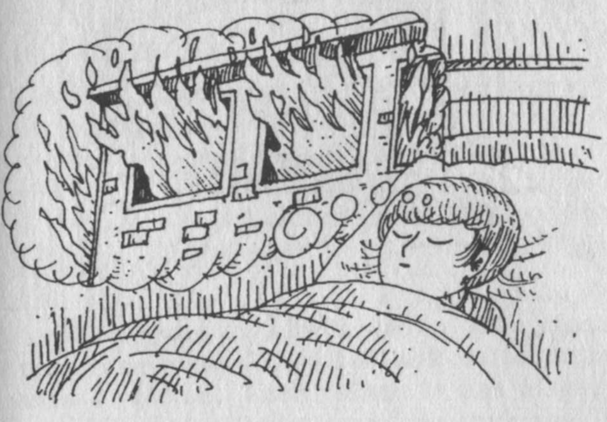
The following reasoning uses [I], [II], and [1].

If Harley told the truth, then: if Harley's hypothesis and conclusion are both false, then he is not the arsonist; if Harley's hypothesis is false and his conclusion is true, then Harley is not the arsonist; if Harley's hypothesis and conclusion are both true, then he is not the arsonist. If Harley lied, then his hypothesis is true and his conclusion is false; then Harley is not the arsonist. So, in any case, Harley is not the arsonist. Then Foster lied.

Suppose Harley lied. Then, since Foster lied, Gordon or Ingram was the arsonist. Then Judson told the truth because his conclusion was true and, from [2], Gordon told the truth. Then Ingram did not tell the truth and he did not lie. This situation is impossible, so Harley told the truth.

(i) Suppose Judson told the truth; then Ingram did not tell the truth, so he lied; then Gordon told the truth. (ii) Suppose Judson lied; then, if Gordon told the truth, then Ingram did not tell the truth and Ingram did not lie; so Gordon lied; then the arsonist's room is not next to the room of a writer who lied; then, in order that at least one writer (Judson) satisfy that condition, Ingram told the truth. Thus either (i) Ingram lied and both Gordon and Judson told the truth, or (ii) Ingram told the truth and both Gordon and Judson lied.

It has already been established that Foster lied and Harley told the truth. In (i): Since Gordon told the truth, the arsonist was either Gordon, Harley, or Judson, from [2]. Then the arsonist told the truth because Gordon, Harley, and Judson all told the truth. Then the arsonist won the award for Best Novel; thus, because Harley told the truth, Judson was the arsonist. In (ii): Since Gordon lied, Judson was the arsonist, from [2]. So in any case, *Judson was the arsonist.*



Part Three: The Thief

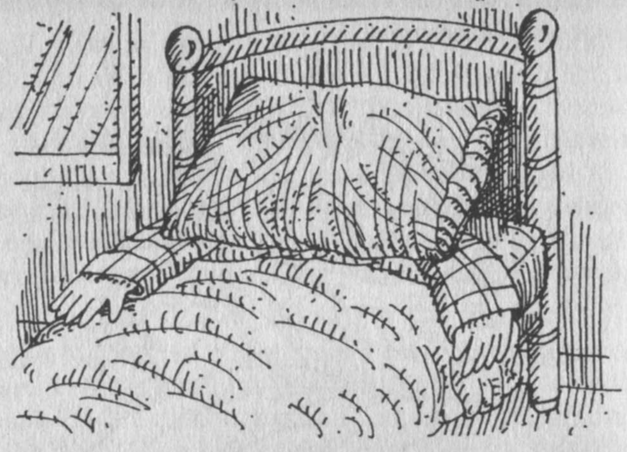
The following reasoning uses [I] [II], and [1].

If the thief told the truth, then Mason did not tell the truth and he did not lie; so the thief lied. Then Orval did not tell the truth, so he lied.

Then Logan did not lie, so he told the truth, and at least one other writer also told the truth. Then, from [2], Kirby did not tell the truth; so he lied, and two writers who had adjacent rooms lied. So Nevin lied (either Nevin and Mason both lied or Nevin and Orval both lied) and, since Logan told the truth, Mason told the truth.

Then, because both Nevin and Orval lied, *Nevin was the thief.*

Part Four: Death of a Mystery Writer



The following reasoning uses [I], [II], and [1].

Suppose Sanford told the truth. Then, from [2], Thurman did not tell the truth, so he lied. Then two writers who had adjacent rooms lied; so from [2], Quentin was one of those who lied (either Quentin and Preston lied or Quentin and Raleigh lied). Then Quentin's hypothesis was true and his conclusion was false. Then the murderer told the truth and the murderer's room was not next to the room of a writer who lied; this situation is impossible, from [2]. So Sanford lied.

Suppose Thurman told the truth. Then: (i) If Quentin told the truth, then Preston and Raleigh lied, from [2] and because no two writers who had adjoining rooms told the truth. Then, since Raleigh and Sanford lied, the murderer was either Quentin or Sanford. But Preston's conclusion was false because he lied, so neither Quentin nor Sanford was the murderer. This

situation is impossible. (ii) If Quentin lied, then his hypothesis was true and his conclusion was false. Then the murderer told the truth and the murderer's room was not next to the room of a writer who lied. But, since it has already been established that Sanford lied, this situation is impossible, from [2]. So, from (i) and (ii), Thurman lied.

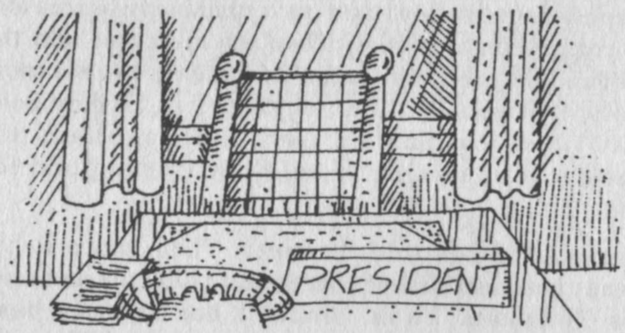
Suppose Quentin lied; then his hypothesis was true and his conclusion was false. Then the murderer told the truth and the murderer's room was not next to the room of a writer who lied. But, since, it has already been established that Sanford (and Thurman) lied, this situation is impossible, from [2]. So Quentin told the truth.

Suppose, Raleigh told the truth. Then, since it has already been established that Sanford lied, the murderer was Thurman. Then, since it has already been established that Quentin told the truth and Thurman lied, Quentin's hypothesis was true, then since Quentin told the truth, his conclusion was true; then the murderer's room was next to the room of a writer who told the truth. This situation is impossible, from [2] and because Sanford lid. So Raleigh lied.

Since Raleigh and Sanford lied, the murderer was Quentin or Sanford. Suppose Sanford was the murderer; then since Quentin told the truth and Sanford lied, Quentin's hypothesis was true; then since Quentin told the truth, has conclusion was true; then the murderer's room was next to the room of a writer who told the truth. This situation is impossible, from [2] and because Raleigh and Thurman both lied. So Sanford was not the murderer.

Then *Quentin was the murderer*. Then, since Preston's conclusion was true, he told the truth; then Preston's hypothesis was true because the murderer told the truth, Quentin's hypothesis was false, and Quentin's conclusion was true — from [2] – because Preston told the truth.

The Gourmet Diners



Part One: The President of the Club.

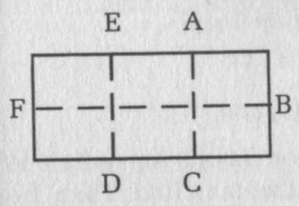
The following reasoning uses [I] and [II].

From [3], two men sat directly across from each other, and a man and a woman sat directly across from each other. So two women sat directly across from each other and, from [3], (a) the two women who sat directly across from each other were April and Carla. Then, from [1], (b) April sat on Ellen's immediate left.

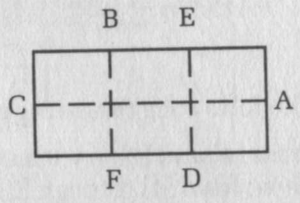
From [2], if Derek sat on Basil's immediate right, then Basil did not sit on a woman's immediate left, as required by [1]. So (c) Derek sat on Felix's immediate right. Then, from (3), (d) Felix sat directly across from Basil. Then, since April and Carla sat directly across from each other, (e) Derek sat directly across from Ellen.

The president of the club was neither April nor Carla, from [4] and (a); nor Ellen – From [4], (a), and (b); nor Felix, from [4] and (c); nor Derek, from [4] and e. So *the president of the club was Basil.*

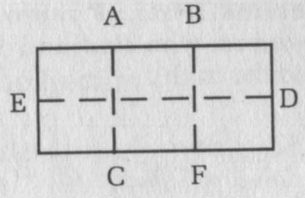
Using (a) through (e) one can proceed to place the players around the table in any of three ways as follows (A represents Aril etc.) First, place Felix and Basil directly across from each other in each of the three possible positions, from (d). Secondly, place Derek, from (c). Thirdly, place Ellen, from (e). Fourthly, place April from (b). Fifthly, place Carla, from (a).



Case i



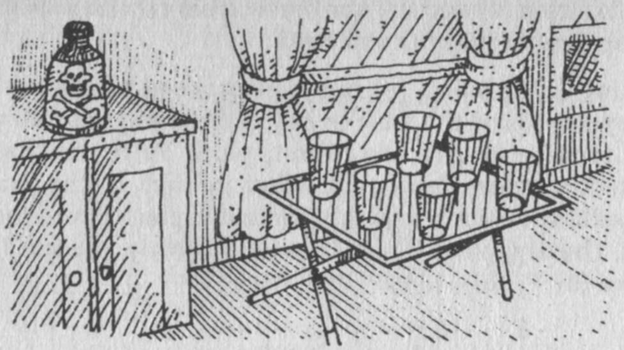
Case ii



Case iii

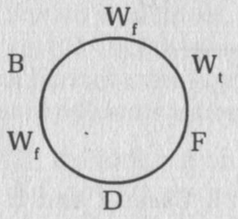
Case iii is impossible, from [2]. Cases i and ii are possible; turned upside down, each seating arrangement remains the same.

Part Two: The Suspected Poisoner

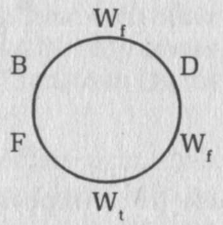


The following reasoning uses [I] and [II].

From [4] and [7], a woman sat on Basil's immediate left. Then, from [1] through [3], that woman lied. Then, from [4] through [7], the diners were arranged around the table in one of the following ways — disregarding how they sat directly across from each other (B represents Basil, D represents Derek, F represents Felix, W_f represents a woman who lied and W_t represents a woman who told the truth).



Case i

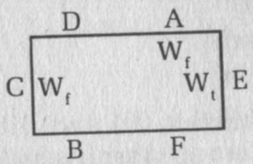


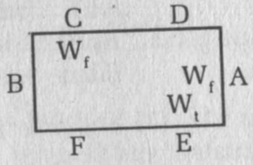
Case ii

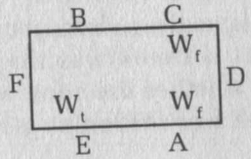
Suppose Case i is the correct way. Then from [1] through [3], W_t is Ellen. Then, from [1] and [2], the woman on Derek's immediate left cannot have lied. This situation is impossible, so Case i is not the correct way.

Then Case ii is the correct way. Then from [1] through [3], W_t is Ellen. Then from [1] and [2], the woman on Derek's immediate left is April — Carla cannot have lied if she was that woman. Then the remaining woman is Carla. So, from [4] and [7], *Basil suspected Carla of trying to poison his drink.*

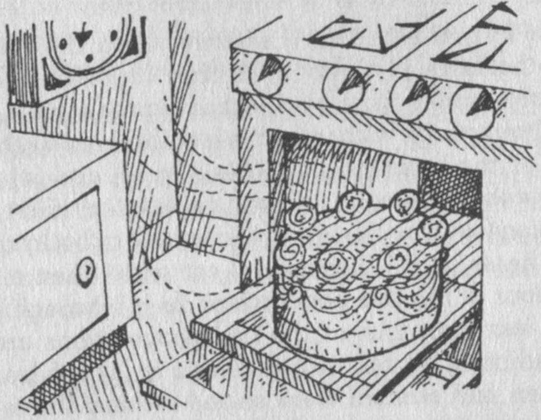
From Case ii, any of the three seating arrangements shown below and on the next page may be correct (A represents April, etc). Turned upside down, each seating arrangement remains the same.







Part Three: The Recipe



The following reasoning uses [I] and [II].

From [1], [2], and [5], the possibilities for recipe giver and cook are the following.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Recipe giver	Felix	Felix	Basil	Derek	Basil	Derek
Cook	Ellen	Basil	Felix	April	Ellen	Carla

From [1], [2], and [6], the possibilities for recipe giver and cook are the following.

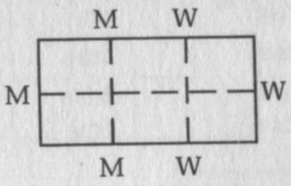
	(vii)	(viii)	(ix)
Recipe giver	April	Ellen	Carla
Cook	Ellen	April	Basil

From [1], [2] and [4], possibilities (ii) and (iii) are eliminated; and from [3], there are no other possibilities. From the remaining possibilities, if anyone besides Derek was the recipe giver, then you would know who the cook was; but if Derek was the recipe giver, you would not know whether the cook was April or Carla. So, from [7], *Derek was the recipe giver.*

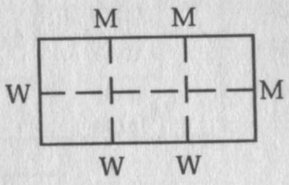
Part Four: Death of a Gourmet Diner

The following reasoning uses [I] and [II].

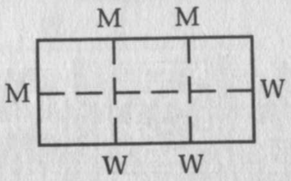
If the hypothesis in [5] is true, then the common hypothesis in [1] and [2] is true (*common* because directly-across-from-each-other women must occur simultaneously with directly-across-from-each-other men) or the Common hypothesis in [3] and [4] is true (*Common* because side-by-side women must occur simultaneously with side-by-side men), or both common hypotheses in [1] through [4] are true. Then since at least four of the five conclusions in [1] through [5] are false, less than four of the five propositions are true, contradicting [6]. So the hypothesis in [5] is false. Then the men and women were seated around the table in one of the following ways (M represents a man and W represents a woman). Turned upside down, each seating arrangement remains the same.



Case i



Case ii



Case iii

If Case i is a correct way, then the common hypothesis in [1] and [2] is true and the common hypothesis in [3] and [4] is true. Then, since at least three of the four conclusions in [1] through [4] are false, less than four of the five propositions are true, contradicting [6].

So case i is not a correct way. Then only the common hypothesis in [3] and [4] is true. Then, because Ellen did not sit across from April, the conclusion in [4] is false. Then [4] is the only proposition that is false, as required by [6]. Then [3] is a true proposition; then the conclusion in [3 is true. Then *Derek was the murderer* and he sat directly across from April.

In summary:

	Hypothesis	Conclusion	Proposition
[1]	false	false	true
[2]	false	false	true
[3]	true	true	true
[4]	true	false	false
[5]	false	false	true

The Vacationers

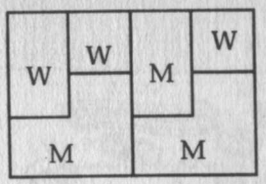
Part One: The Travel Agent

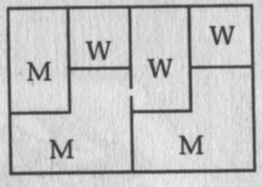
Bermuda
PARIS

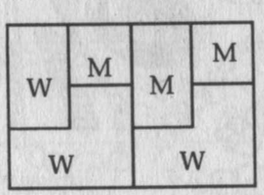
The following reasoning uses [I] and [II].

From [3], (i) Both large rooms and the one medium-sized room were occupied by the members of the same sex. From [1] and [2], (ii) The widower's daughter stayed in a room that bordered on only two other rooms because the three rooms that did not border on hers were occupied by the widower and her son and daughter.

So, from (i) and (ii), the rooms were occupied in one of the following three ways (M represents a man and W represents a woman).





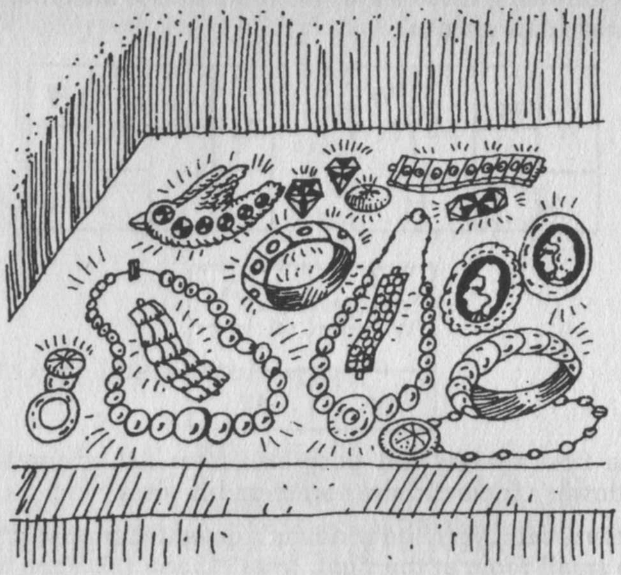


The first way is not possible, from [1], since the widower's room did not border on his son's.

In the second way, the widower's daughter must occupy the small room at the right, from [1] and [2]. Then the widower must occupy the medium-sized room at the left, from [1], and his daughter's daughter must occupy the small room at the left, from [2]. Since the widower's sister must now occupy the same size room as the widower, this situation contradicts [3]. So the second way is not possible.

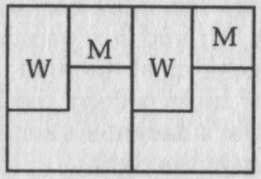
Then the third way is the correct way. The widower's daughter must occupy the medium-sized room at the left, from [1] and [2]. Then the widower must occupy the small room at the right and his son must occupy the small room at the left, from [1]; and his daughter's daughter must occupy the large room at the right, from [2]. Then the widower's sister must occupy the large room at the left and the widower's daughter's son must occupy the medium-sized room at the right.

So, from [4], *the widower's daughter's son was the travel agent.*

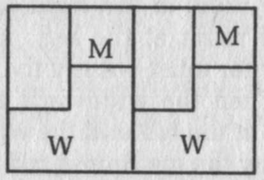


The following reasoning uses [I] and [II].

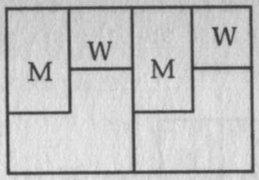
From [2] through [5], the man who was mistaken about the size of the room that he stayed in occupied the same-size room as another man; then two women also occupied the same-size room. So four rooms were occupied in one of the following six ways (M represents a man and W represents a woman).



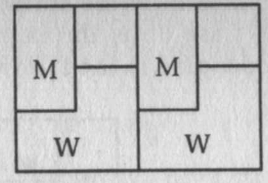
Case 1a



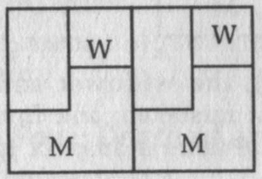
Case 1b



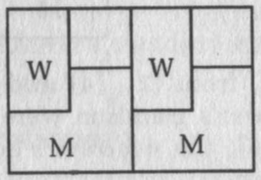
Case 2a



Case 2b



Case 3a



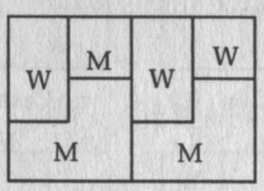
Case 3b

A man cannot occupy either of the remaining rooms in Case Ib, Case 2b or Case 3a. Otherwise, one man-occupied room borders on only one woman-occupied room, contradicting [1].

In Case la, a man cannot occupy the large room on the right. Otherwise, one man-occupied room borders on only one woman-occupied room, contradicting [1]. Also a man cannot occupy the large room on the left. Otherwise, one man-occupied room borders on three woman-occupied rooms, contradicting [1].

In Case 2a, a man cannot occupy the large room on the left. Otherwise, one man-occupied room borders on only one woman-occupied room, contradicting [1]. Also a man cannot occupy the large room on the right. Otherwise, one man-occupied room borders on three woman-occupied rooms, contradicting [1].

In Case 3b, a man cannot occupy the small room on the right. Otherwise, one man-occupied room borders on only one woman-occupied room, contradicting [1]. But a man can occupy the small room on the left, satisfying [1]. So Case 3b is the correct case and the six rooms were occupied in the following way.

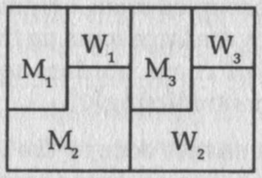


Then, from [2], [4] and [5], the widower and the widower's grandson were not mistaken; and from [3] and [5], *the widower's son became a suspect in the robbery.*

Part Three: The Rescue

The following reasoning uses [I] and [II].

From [1], the rooms were occupied in the following way (M_1 represents the widower, W_1 his sister, M_2 his son, W_2 his daughter, M_3, his grandson, and W_3 his granddaughter).



From [2] and [6], then, if the rescuer and the person rescued were the same sex, then they are one of the following pairs.

$$M_1 - M_2 \; M_1 - M_3 \; W_1 - W_3$$

From [4], only the pair M_1 - M_2 remains as a possibility.

From [2] and [6], then, if the rescuer and the person rescued were the opposite sex, then they are one of the following pairs.

$$W_1 — M_2 \; W_1 — M_3 \; W_2 — M_3$$

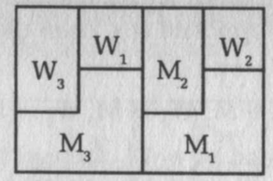
From [3], W_1 rescued M_2 or W_1 rescued M_3, or M_3 rescued W_2. From [5], then: the pair $M_1 - M_2$, $W_1 - M_2$, and $W_1 - M_3$ are eliminated.

So, M_2 rescued W_2 and the *widower's grandson was the rescuer.*

Part Four: Death of a vacationer

The following reasoning uses [I] and [II].

From [1], the rooms were occupied in the following way (M_1 represents the widower, W_1 his sister, M_2 his son, W_2 his daughter, M_3 his grandson, and W_3 his granddaughter).



Then, from [2] and [3] and from substituting each vacationer in turn for 'murderer' in each of their statements, the truth or falsity of each vacationer's statement is as follows (t represents true and f represents false).

Vacationer as murderer	Statement made by				
	M$_2$	M$_3$	W$_1$	W$_2$	W$_3$
M$_2$	f	f	t	t	t
M$_3$	t	f	t	f	t
W$_1$	f	f	f	t	t
W$_2$	f	t	t	f	t
W$_3$	t	t	f	t	f

Then, from [4] *the widower's sister was the murderer* because only then can other than two vacationers have lied: three vacationers lied.

The Portrait

From [II] and [III], the portrait is in two boxes with one inside the other. From [I] then, on the two boxes that contain the portrait, either:

i) both inscriptions contain only true statements,

ii) one inscription contains only true statements and one inscription contains at least one false statement, or

iii) both inscriptions contain at least one false statement.

The following reasoning uses [IV] as well as [I] through [III].

Suppose (i) is correct; that is, suppose the portrait is in two boxes where both inscriptions contain only true statements.

Then each 1b (those on each small box 1 and on the large box 1) is true. Then the portrait is in large box 2. Then large-box Inscription 2 contains only true statements. Then 2a on large box 2 is true. But 2a on large box 2 cannot be true. So (i) is not correct.

Suppose (iii) is correct; that is, suppose the portrait is in two boxes where both inscriptions contain at last one false statement. . Then either:

(x) one large box inscription contains only true statements and one large-box inscription contains at least one false statement, or

(y) both large-box inscriptions contain at least one false statement.

Suppose (x) is correct when (iii) is correct, and suppose large box Inscription 1 contains at least one false statement. Then the portrait is in large box 1 and large-box Inscription 2 contains only true statements. But neither 2b nor 2c on large-box 2 can be true. So large-box inscription 1 does not contain at least one false statement when (x) is correct and (iii) is correct. So large-box Inscription 2 contains at least one false statement when (x) is correct and (iii) is correct. Then the portrait is in large box 2 and large-box Inscription 1 contains only true statements. But 1c on large-box 1 cannot be true. So large-box Inscription 2 does not contain at least one false statement when (x) is correct and (iii) is correct. So (x) is not correct.

Suppose (y) is correct when (iii) is correct, and suppose the portrait is in large box 2. Then 2a, 2b, and 2c on large box 2 are all true. But all of Inscription 2 on large box 2 cannot be true. So the portrait is not in large box 2 when (y) is correct and (iii) is correct. So, the portrait is in large box 1 when (y) is correct and (iii) is correct. Suppose the portrait is in small box 2 in large box 1. Then, because 2a and 2b on small box 2 in large box 1 are both true, 2c on small box 2 in large box 1 is false. Then all other small boxes have inscriptions that contain only true statements. Then small-box Inscription 2 in large box 2 contains only true statements. Then 2b on small box 2 in large box 2 is true. But 2b on small box 2 in large box 2 cannot be true. So the portrait is in small box 1 in large box 1. Then on small box 1 in large box 2: 1b is true and since

1c cannot be false, 1c must be true; then 1a cannot be true and 1a cannot be false. This situation is impossible. So (y) is not correct. Then (iii) is not correct.

So (ii) is correct. Then either:

(w) both large-box inscriptions contain only true statements,

(x) one large-box inscription contains only true statements and one large-box inscription contains at least one false statement, or

(y) both large-box inscriptions contain at least one false statement.

Suppose (w) is correct when (ii) is correct, which means the portrait is in a large box inscribed with only true statements, and in a small box inscribed with at least one false statement. Then, from 2b on large box 2, the portrait is in large box 2.

Suppose the portrait is in small box 2 in large box 2. Then, because 2a and 2b on small box 2 in large box 2 are both true, 2c on small box 2 in large box 2 is false. Then all other small boxes have inscriptions that contain only true statements. Then 2b on small box 2 in large box 1 is true. But 2b on small box 2 in large box 1 cannot be true. So the portrait is not in small box 2 in large box 2. So the portrait is in small box 1 in large box 2. Then 2b on small box 2 in large box 2 is false. Then Inscription 2 on small box 2 in large box 2 contains at least one false statement. Then 1a, 1b, and 1c on small box 1 in large box 1 is true. Then Inscription 2 on small box 2 in large box 1 contains only true statements. Then 2b on small box 2 in large box 1 is true. But 2b on small box 2 in large box 1 cannot be true. So the portrait is not in small box 1 in large box 2. So (w) is not correct when (ii) is correct.

Suppose (x) is correct when (ii) is correct. If large-box Inscription 1 contains only true statements, then 1c on large box 1 is true. But 1c on large box 1 cannot be true. So large-box Inscription 1 does not contain only true statements. Then large-box Inscription 2 contains only true statements. Then 2c on large box 2 is true. But 2 c on large box 2 cannot be true. So large-box Inscription 2 does not contain only true statements. So (x) is not correct when (ii) is correct.

So (y) is correct when (ii) is correct, which means the portrait is in a large box with an inscription that contains at least one false statement and in a small box with an inscription that contains only true statements. Then la and lc on large box 1 are true. So 1b on large box 1 is false. Then the portrait is in large box 1. Suppose the portrait is in small box 1 in large box 1. Then Inscription 1 on small box 1 in large box 1 contains only true statements. Then 1b on small box 1 in large box 1 is true. But 1b on small box 1 in large box 1 cannot be true. So the portrait is not in small box 1 in large box 1. *So the portrait is in small box 2 in large box 1.* Then inscription 2 on small box 2 in large box 1 contains only true statements. Then 2b on small box 2 in large box 2 is false. Then Inscription 2 on small box 2 in large box 2 contains at least one false statement. Then 1c on both small boxes 1 are true. Then, because both 1a and 1b are true on both small boxes 1, Inscriptions 1 on both small boxes 1 contain only true statements.

To summarize: The only false statements are 1b on large box 1, 2b on large box 2, and 2b and 2c on small box 2 in large box 2.

Who killed Ty Coon?

The following reasoning uses [II] and [III].

Let A1, A2 and A3 be Arthur's three statements; K1, K2 and K3 be Katherine's three statements, etc.

If the man who was the truthful police informant was either Arthur or Philip, then A3 or P2 is true. Then – from A1, A2, K1, L1, P1, M1 B1 and B2 — the game murderer was either John or George; and, from J1 or G1, at least four people did not make any false statements. If the man who was the truthful police information was either John or George, then – from J1 or G1 – at least four people did not make any false statements. So, at least four people did not make any false statements.

At most five people did not make any false statements, from (i) below.

(i) The two people in each pair that follows did not both make three true statements: Arthur and Beatrice — because A1 and B1 are contradictory, Katherine and Laura – because K2 and L2 are contradictory, and John and George — because J3 and G3 are contradictory.

Suppose five people did not make any false statements. Then from (i), Philip and Martha each made three true statements. Then, from P2 and previous reasoning, John or George is the game murderer and he made three true statements. Then, from M2 and J1 or from M2 and G1, each of two other people also made three true statements and they were with one of Philip and Martha and with the game murderer in either the front or the back of the mansion; the other of Philip and Martha was with three people, who each made at least one false statement, and they were all in the opposite part of the mansion.

Then:

- From K1, Katherine made at least one false statement – if K1 is false, then she made at least one false statement; and if K1 is true, then she was not with the game murderer in either the front or the back of the mansion, which means she made at least one false statement. Then, from (i), Laura made three true statements. (K2 and L2 can both be false — for instance, if Katherine was downstairs and Laura was upstairs – when only four people did not make any false statements; but only one of K2 and L2 can be false when five people did not make any false statements).
- If Arthur and Laura both made three true statements, then they were both in the front or in the back of the mansion, they were both indoors (from A1, A2, and L1), and they were both downstairs (from L2); this situation is impossible, from [1].

So, because Laura made three true statements, Arthur did not make three true statements. Then from (i), Beatrice made three true statements.

So Beatrice and Laura both made three true statements. Then Martha was outdoors (from B1 and M1). Then J2 is false. Then George made three true statements, from (i), and was the game murderer (Laura and Beatrice, the two 'other people' mentioned earlier, were with one of Philip and Martha and with the game murderer in either the front or the back of the mansion); George was indoors (from B1) and in the back of the mansion (from G1). Then Laura and Beatrice were both in the back of the mansion, and Laura and Beatrice, were both outdoors (from L1, B1 and B2). Because Martha was outdoors and because Laura and Batrice were both outdoors in the back of the mansion, Martha was in the front of the mansion from [I]. So Philip was in the back of the mansion with both Laura and Beetrice, from [I].

From L2, Laura was downstairs. Then Beatrice was upstairs, from (I). Then, from B3, Martha was upstairs. From G2, Katherine and John were both upstairs. Then George and Philip were both downstairs, from [I]. Thus, all three of George, Philip, and Laura were in the back of the mansion and downstairs. This situation is impossible from [I].

So exactly four people made no false statements.

Further consideration of the statements leads to the following conclusions.

(ii) Arthur and Katherine did not both make only true statements, if J1 or G1 is true. Otherwise, the game murderer would have made only true statements (from A3), the game murderer would not be Katherine (from K1), and all four people who made only true statements would be in the front or in the back of mansion (from J1 or G1), contradicting K1.

(iii) Arthur and Laura did not both make only true statements, if J1 or G1 is true. Otherwise, both would have been indoors (from A1, A2 and L1), both downstairs (from L2), and both in the front or in the back of the mansion (from J1 or G1), contradicting (I).

(iv) If Arthur made only true statements, then A3 is true. Then John or George made only true statements and is the game murderer (from previous reasoning, supposing that either Arthur or Philip was the police informant).

(v) Katherine and Philip did not both make only true statements, if J1 or G1 is true. Otherwise, the game murderer would have made only true statements (from P2), the game murderer would not be

Katherine (from K1), and all four people who made only true statements would be in the front or in the back of mansion (from J1 or G1), contradicting K1.

(vi) Philip and Martha did not both make only true statements, if J1 or G1 is true. Otherwise, all four people who made only true statements would be in the front or in the back of the mansion (from J1 or G1), contradicting M2.

(vii) If Philip made only true statements, then P2 is true. Then John or George made only true statements and is the game murderer (from previous reasoning, supposing that either Arthur or Philip was the police informant).

(viii) Martha and Beatrice did not both make only true statements, if J1 or G1 is true. Otherwise, both would have been outdoors (from B1, B2 and M1) both either upstairs or downstairs (from B3), and both in the front or in the back of the mansion (from J1 or G1), contradicting [I].

From (i), the group of four people who made only true statements is one of the following (using A for Arthur, K for Katherine etc.)

a. AKPM
b. AKPJ
c. AKPG
d. AKMJ
e. AKMG
f. ALPM
g. ALPJ
h. ALPG
i. ALMJ
j. ALMG
k. APMJ
l. APMG
m. KPMB
n. KPMJ
o. KPMG
p. KPBJ
q. KPBG
r. KMBJ
s. KMBG
t. LPMB
u. LPMJ
v. LPMG
w. LPBJ
x. LPBG
y. LMBJ
z. LMBG
aa. PMBJ
bb. PMBG

From (ii), groups b, c, d, and e are impossible.
From (iii), groups g, h, i, and j are impossible.
From (iv), groups a, and f are impossible.
From (v), groups n, o, p, and q are impossible.

From (vi), groups k, l, n, o, u, v, aa, and bb are impossible.
From (vii), groups m and t are impossible.
From (viii), groups r, s, y, and z are impossible.

So the group is either w or x.

So the four people who made only true statements are Laura, Philip, Beatrice, and either John or George.

Suppose George and the other three people made only true statements. Then, from G1, all four were in the back of the mansion. Then the other four were in the front of the mansion, Beatrice was outdoors (from B2), and Laura was outdoors (from L1 and B1). Then because Laura was downstairs (from L2), Beatrice was upstairs (from [1]). Then, Martha was upstairs (from B3). Then Katherine and John cannot both have been upstairs (from [I]). This situation contradicts G2. So George did not make only true statements.

So John and the other three people made only true statements. Then the following locations have been established (from L1, L2, P1, P2, B1, B2, J1 and J2; using F for front, B for back, O for Outdoors, I for indoors, U for upstairs, and D for downstairs).

Arthur Coon	B	D		
Katherine Davies	B			
Laura Coon	F	O	D	
Philip Lambert	F			
Martha Grayson	B	I		
Beatrice Coon	F	O		
John Davies	F	I		game murderer
George Bentley	B	I		

Then, from [I], the following two chains of reasoning can occur. Chain 1: Then Philip was indoors, and Arthur and Katherine were both outdoors. Then

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Katherine was upstairs. Then (from P3) Philip was downstairs. Then John was upstairs. Chain 2: Then Beatrice was upstairs. Then (from B3) Martha was upstairs. Then George was downstairs.

In summary:

Arthur Coon	B	O	D	
Katherine Davies	B	O	U	
Laura Coon	F	O	D	
Philip Lambert	F	I	D	
Martha Grayson	B	I	U	
Beatrice Coon	F	O	U	
John Davies	F	I	U	game murderer
George Bentley	B	I	D	

Arthur Coon	A1 and A2 are false, A3 is true.
Katherine Davies	K1 is true, K2 is false.
Laura Coon	L1, L2 and L3 are true.
Philip Lambert	P1, P2 and P3 are true.
Martha Grayson	M1 is false, M2 is true.
Beatrice Coon	B1, B2 and B3 are true.
John Davies	J1, J2 and J3 are true.
George Bentley	G1 is false, G2 is true.

Because L3 is true, k3 is true. Because J3 is true, G3 is false. So the murderer made exactly one false statement and is either Katherine or Martha. (Arthur and George each made two false statements.) If the murderer was Martha, then M3 would be false and she would have made two false statements, contradicting J3. So M3 is true and *Katherine Davies killed Ty Coon.*

From [III], the truthful police informant was either Philip Lambert or John Davies.